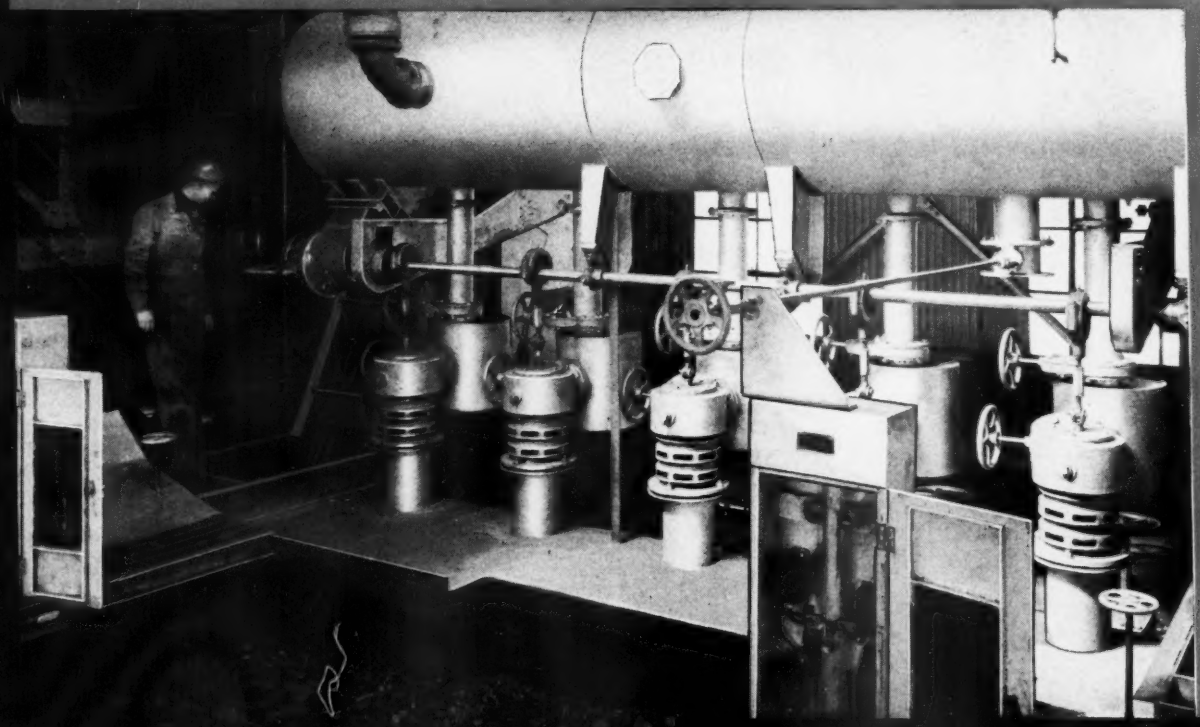
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AMERICAN MINING CONGRESS

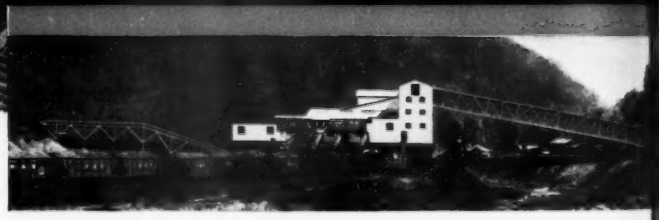
OCTOBER 1949



More Repeat Orders for Link-Belt Air-Pulsated Washers



12 for Island Creek Since 193



Above: Single Link-Belt air-pulsated washer similar to those used at Island Creek and Pond Creek preparation plants.

Right: Link-Belt tipple and washery at Pond Creek Pocahontas Co., Bartley, W. Va.

In 1931 the Pond Creek Pocahontas Company put into operation a Link-Belt air-pulsated washer with a capacity of 140 tons per hour. Since then, Island Creek and associated companies have installed 11 more Link-Belt air-pulsated washers with capacities up to 400 tons per hour.

The Link-Belt washer uses compressed air as the pulsating medium. This permits graduated pulsations in the different compartments; the immediate removal of heavy refuse; sharp separation of lighter refuse and bone from coal. It permits washing unsized coal in one box; accurate screening after washing with minimum degradation; one man operation and easy adjustment, while running. It combines large capacity and high efficiency with low operating and maintenance cost.

Let us give you further information on Link-Belt coal preparation and handling equipment.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Louisville 2, Birmingham 3, Denver 2, Kansas City 6, Mo., Cleveland 15, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8. 11,208

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered and Built *by* LINK-BELT



WHY NOT GET THAT EXTRA LOADING TIME?

What really counts is the total number of hours your loading machine can operate over a period of time. Many delays which occur are beyond control but you can guarantee your loader delays to be at a minimum if you use Whaley "Automats."

THE AUTOMAT'S RUGGED CONSTRUCTION GUARANTEES AN ABSOLUTE MINIMUM OF LOADER BREAKDOWN DELAYS.

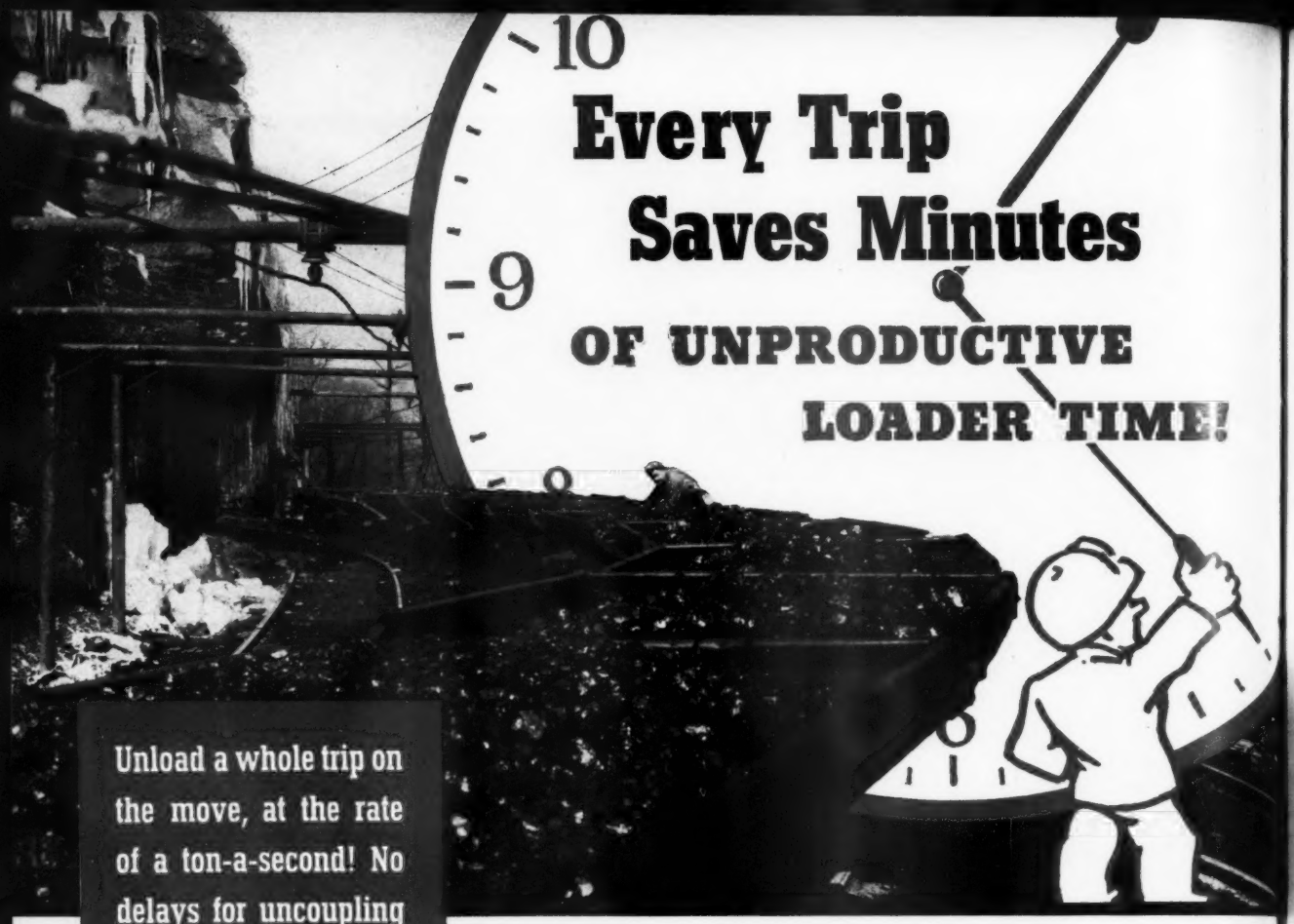
THE AUTOMAT'S SIMPLICITY GUARANTEES A QUICK REPAIR AND EARLY RETURN TO LOADING.

RESULT—MAXIMUM LOADING TIME . . . MAXIMUM CAPACITY.

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"Mechanical Loaders Exclusively for Over 40 Years"

KNOXVILLE **TENNESSEE**



Unload a whole trip on the move, at the rate of a ton-a-second! No delays for uncoupling ...no stopping to dump with a.C.f. Drop Bottom Mine Cars!

The faster mine cars get back to the loaders, the more actual working time those loaders deliver!

a.C.f. Drop Bottom Mine Cars save minutes by dumping on the move. A whole 16-car trip of five-ton cars empties in 80 seconds. Lubricated doors unlatch-and-latch automatically. No delays, no breaking up the trip. Minutes earlier, the cars head back down to the mine... minutes earlier, the trip is in place, waiting to be loaded!

You may find a.C.f. Drop Bottom Mine Cars as highly profitable in your mine as many other operators have. Our nearby sales representative will gladly work with you on your hauling problems. Call him today.

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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3 PROVED WAYS TO CUT

WITH NON-EXPLOSIVE

CARDOX



1

Savings begin right at the mine face when the gentle, heaving action of expanding carbon dioxide replaces explosives. CARDOX mined coal is coarser and is rolled forward for quicker, easier loading. Complete absence of smoke and noxious fumes enables resumption of work without time loss immediately after shooting. Because there is less shattering, coal cleaning costs are lower; roof control costs are sharply reduced. Finally, CARDOX produces more premium size coal per ton due to reduction in costly degradation at the face, in shipping and storage.

AIRDOX



2

AIRDOX "shoots" coal with compressed air. Its "soft" action in breaking down the face produces a high percentage of coarse sizes free from shatter cracks . . . shears rib and top cleanly . . . rolls the coal forward in a loose pile for quick loading . . . reduces roof failure danger. Crews can enter immediately after the fall. Recommendations as to whether CARDOX or AIRDOX is the more efficient and economical for any particular mine will be made after examination by one of our engineers.

GET THE FULL SAVINGS STORY

Write today for complete information on CARDOX, AIRDOX and CARDOX-BECCO equipment as applied to your operations.

MINING COSTS

MINING METHODS

COAL RECOVERY DRILL



3

The Cardox-Hardsocg "Coal Recovery Drill" makes profitable the salvage of tonnage where over-burden removal has become too costly for further stripping. The specially designed augers, available in diameters of 20" to 30", carry the coal in a continuous flow from the seam—can be used with portable conveyors for automatically loading trucks or cars.

CARDOX-HARDSOCG Carbide Tipped Cutterheads



Tipped with carbide that approaches diamond-hardness, these Cardox-Hardsocg Cutterheads reduce drilling costs four ways. (1) They multiply footage between cutterhead changes; (2) their drilling capacity in hard material far exceeds that of molefoot drills; (3) they step up drilling rates under most conditions; (4) they have longer life in the heaviest service. Available in 2, 2¼, 2½, 2¾ and 3-inch sizes with two wings; in 5, 6, 6½ and 7-inch sizes with three wings; 8 and 9-inch sizes with four wings. May be had with recessed core breaker as shown or extended pilot and with spline, square or hexagon connection.

CARDOX CORPORATION

CHICAGO, ILLINOIS

NO BUMPS... NO BLOWS... NO BURNS

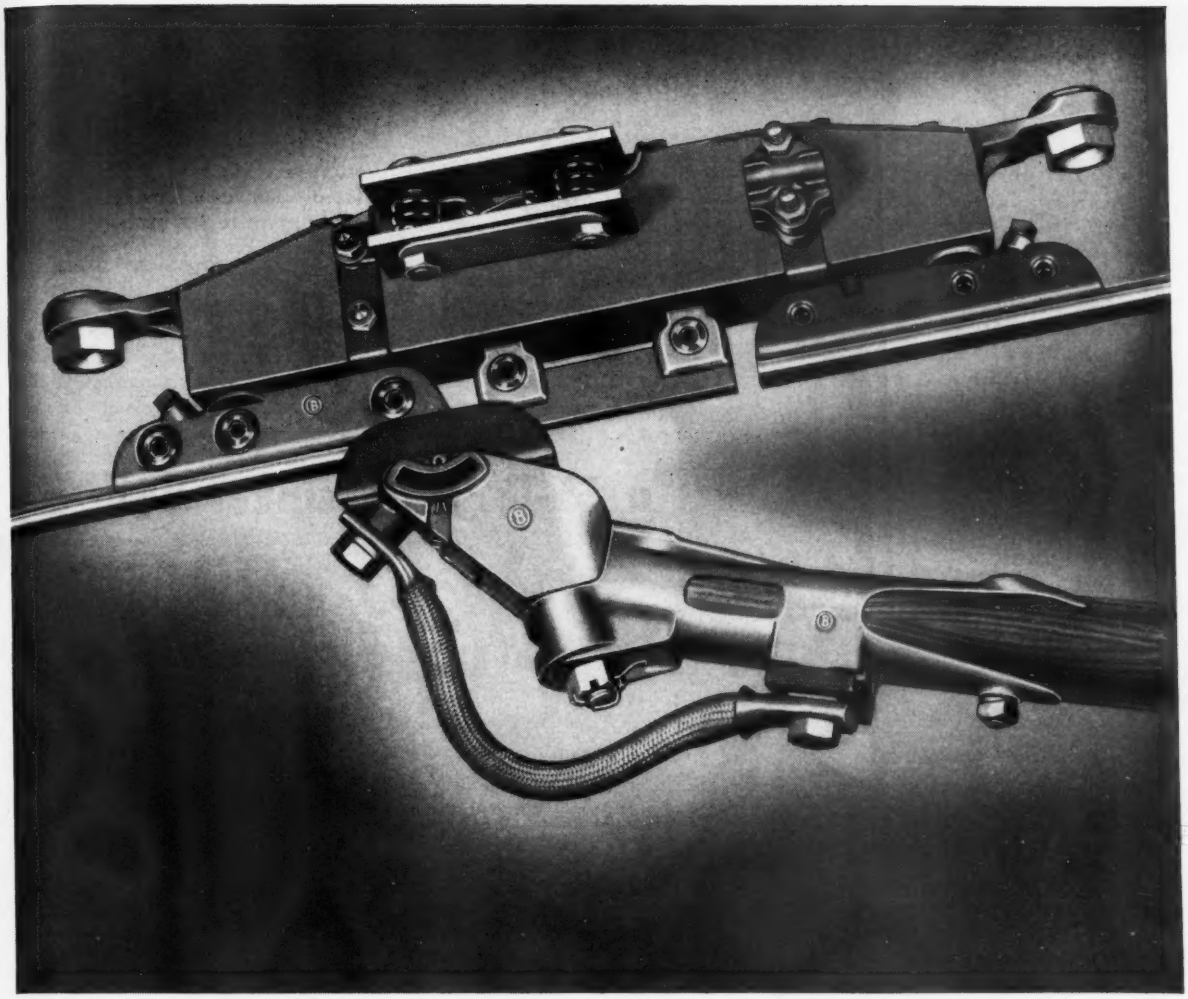
O-B Smooth-Underrun Fittings Can Make Your Trolley Overhead As Smooth As One Continuous Piece of Wire from Face to Tipple

No longer need you tolerate "bumps, blows and burns" in your overhead system . . . a destructive trio caused by wire encircling fittings. Such fittings are a constant source of arcing and wire burning, shortening the life of wire and collectors. By building with O-B Smooth-Underrun Fittings, you can obtain a trolley wire that is as smooth as one continuous piece from face to tipple.

Instead of surrounding the wire with excess metal at attachment points, O-B Smooth-Underrun Fittings grip the upper lobe only, leaving the lower running surface of the wire free and unobstructed. Separable anchor tips provide a smooth, level transition for current collectors at frogs and cross-overs. All runner pieces are designed with a cross-section similar in size and shape to that of actual wire.

Because of this smooth-underrun principle, your locomotives can operate safely at higher speeds; fewer dewirements will occur; both wire and collector life will be lengthened. For your next trolley overhead system, insist on O-B Smooth-Underrun Fittings.

3009-M



Typical of O-B's complete line of Smooth-Underrun Material, the new Type-T Section Insulator eliminates the wire-encircling bumps found in previous designs. Notice how the end runner jaws grip the trolley wire by the upper lobe only, leaving a free and unobstructed running surface for the current collector. The center runner may be adjusted so that the underrun surface is continuous at the same level. Other O-B Smooth-Underrun devices include Bulldog Trolley Clamps and Splicers, Type-M Frogs and Crossovers, and Types-R and T Section Insulator Switches.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Company, Ltd.
Niagara Falls, Ontario



new!

a 55-lb. class sinker with a 4-in-1 backhead

New in design . . . easy to hold . . . tops in drilling speed, rotation, hole cleaning and all-around performance . . . is the new CP-59 Sinker Drill.

Now, for the first time, you can get a sinker with a 4-in-1 backhead that meets *all* operating conditions: **plain dry . . . blower dry . . . plain wet . . . air-water** operation. One backhead meets all four requirements; change-overs from one type to another are quick and inexpensive.

Entirely new valve design gives maximum drilling speed and rotation power, with minimum air consumption. Large, flexible retainer spring makes for easy operation. A new type of lubricating system assures positive lubrication of all working parts.

Rotation nut and cylinder bushing liner are bronze, to eliminate scoring and reduce maintenance.

For complete information, ask for SP-3009.

CHICAGO PNEUMATIC TOOL COMPANY

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How TIMKEN® bearings help the coal roll

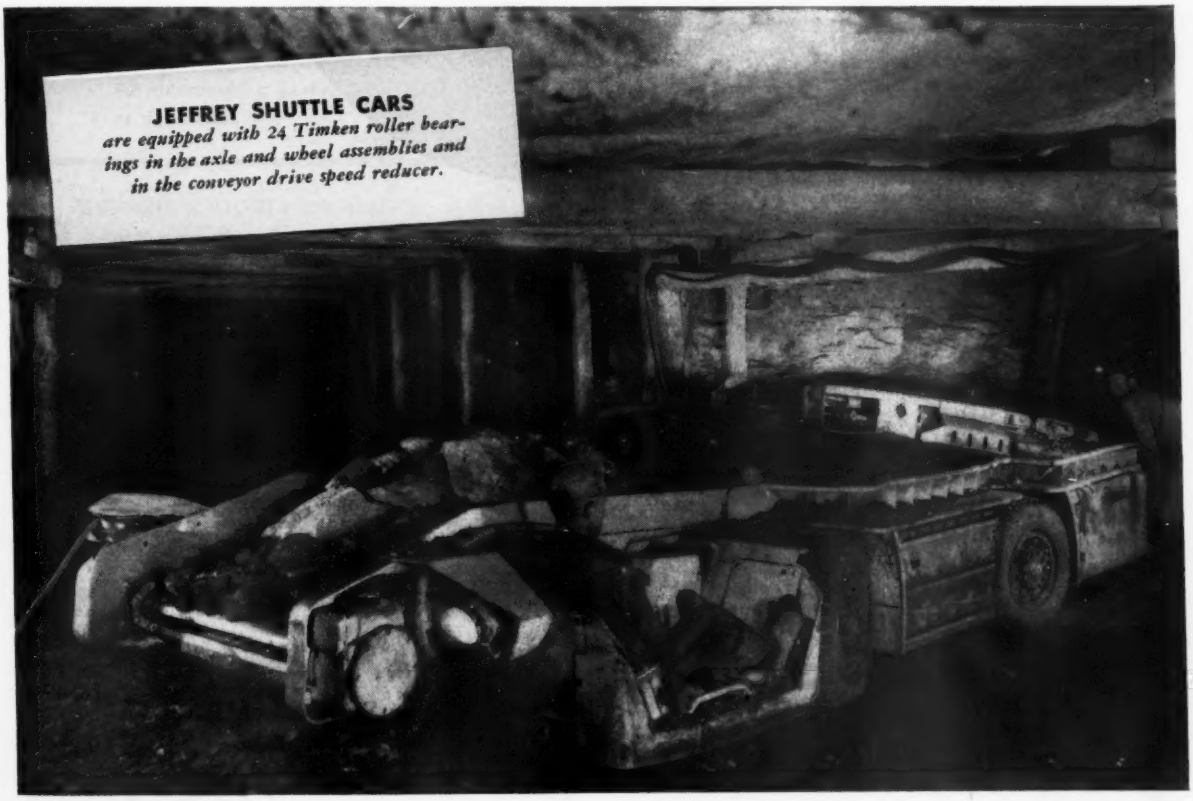
THE Jeffrey Manufacturing Company insures dependable, trouble-free shuttle car operation by mounting axle and wheel assemblies and conveyor drive speed reducer on Timken® tapered roller bearings.

Timken bearings hold wheels, shafts, and gears in proper alignment—prevent excessive wear on moving parts. They practically eliminate out-of-service time for bearing lubrication and maintenance.

Due to the line contact between rolls and races, Timken bearings have extra load-carrying capacity. They take both radial and thrust loads in any combination. Their true rolling motion and incredibly smooth surface finish enable Timken bearings to operate freely, frictionlessly. And Timken bearings permit the use of closures which effectively retain lubricants, keep dirt out.

No other bearing can give you *all* the advantages you get with Timken tapered roller bearings. Be sure you have them in your mining equipment wherever the loads are tough. Look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.





POSITIVE ROLLER ALIGNMENT

Wide area contact between roll ends and rib of the cone prevent Timken roller bearings from skewing. Result: bearings roll easier, last longer.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

TIMKEN 1899 50 1949 YEARS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST ◎ LOADS OR ANY COMBINATION



Often worth its weight in Gold!

When production groans to a halt because of broken or fractured equipment, many shop-owners would gladly pay the price of gold for the few ounces of bronze needed for a reliable repair-weld.

They don't have to, of course. For repair-welding with Anaconda Bronze Rods—particularly Tobin Bronze*—is a low-cost, low-temperature method of oxyacetylene welding on cast or malleable iron, steel or copper alloys.

Over the decades that time-tried Tobin Bronze has served so well, many "new" rods and procedures have sprung up with mushroom-like growth, only to disappear as quickly—victims of their own lack of dependability!

Whether you do your own repair welding or call on outside help, play it safe—insist on genuine Tobin Bronze.

49152

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

*Reg. U. S. Pat. Off.

DON'T SCRAP IT . . . BRONZE WELD IT!

Bronze welding is safe, speedy and economical. Large or small, bronze welds are tough and readily machinable, high in strength and low in residual stresses—an ideal combination for repair welding, for building up worn surfaces, and for production welding, too. Tobin Bronze and other Anaconda Welding Rods are described in this NEW, 17th Edition of Publication B-13. Write for a copy.

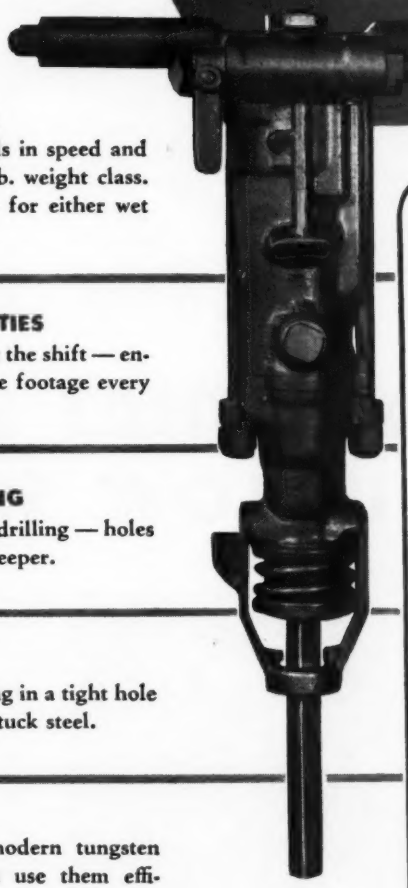


ANACONDA
from mine to consumer

Anaconda
BRONZE WELDING RODS

new! GARDNER-DENVER S48 Sinker

. . . no other Sinker gives you all these advantages!



SUPERIOR DRILLING PERFORMANCE
— equals most 55-pound drills in speed and power — yet is in the 45-lb. weight class. An outstanding performer for either wet or dry drilling.

SUPERIOR RIDING QUALITIES
— easier handling throughout the shift — enables operator to drill more footage every day.

SUPERIOR HOLE CLEANING
— better hole-cleaning while drilling — holes are bottomed faster and deeper.

SUPERIOR ROTATION
— extra fight keeps bit turning in a tight hole — reduces possibility of stuck steel.

SUPERIOR DESIGN
— especially suitable for modern tungsten carbide bits — helps you use them efficiently.

SUPERIOR CONSTRUCTION
— rugged, dependable, simple — fewer trips to the shop.

No other Sinker has all these advanced features

- Exclusive backhead design — lets you change from wet to dry or to automatic air-operated water control without taking the drill apart — without changing the backhead. Simply change the gland and tube.
- Air or water tube comes out with the gland — no fishing for an elusive tube.
- Straight throttle valve — will not bind or leak.
- Air-cleaning screen that automatically cleans itself when blowing.
- New-type, free swiveling water connection — has positive water seal and large area tubular screen.
- Exclusive steel puller — swings clear of the chuck — easily operated by foot or hand — easily assembled without wrenches — no nuts to keep tight.
- Write today for full information on the NEW Gardner-Denver S48 Sinker.

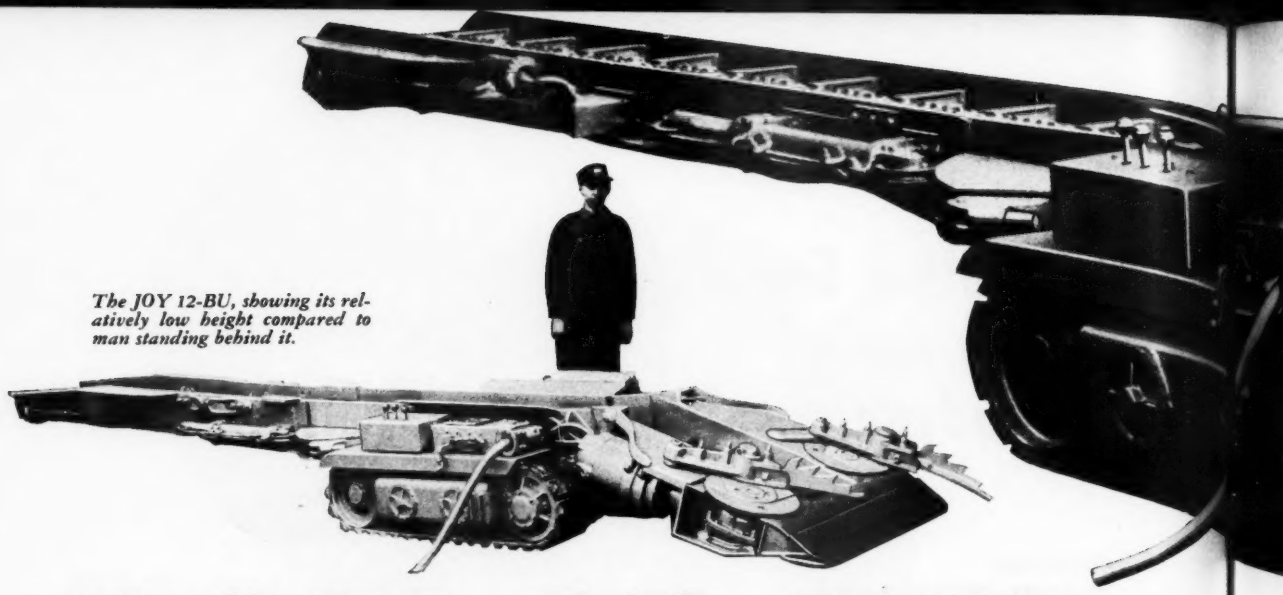


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Since 1859

Gardner-Denver Company, Quincy, Illinois

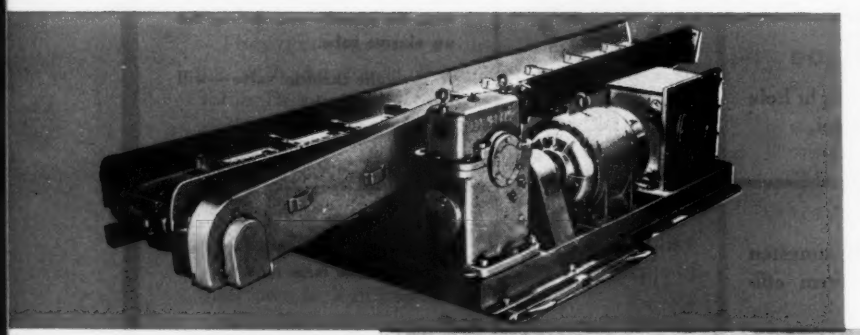
In Canada:
Gardner-Denver Company (Canada) Ltd., Toronto, Ontario



The JOY 12-BU, showing its relatively low height compared to man standing behind it.

JOY 12 BU-

THE LOADER THAT SETS THE PACE IN LOW SEAMS

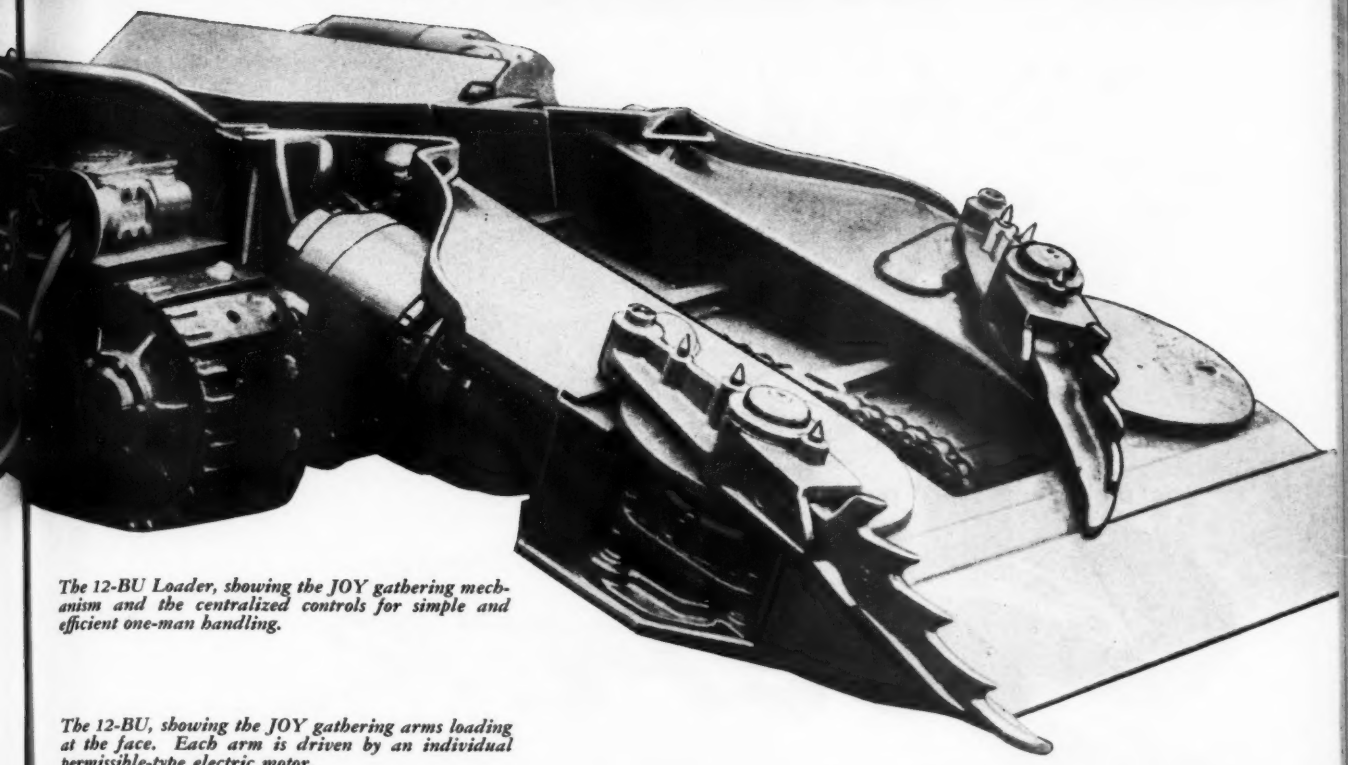


The JOY 12-BU Loader was designed and built specifically to cut costs in thin-seam operation. It is a mobile unit only 28¾" high, which will operate efficiently in 30" seams under proper conditions. Particularly suited for loading on conveyors in thin seams, but can be adapted for loading into mine cars in higher seams. The JOY articulated chain conveyor may be swung 45° either side of center. For details of the 12-BU, or other JOY Loaders to suit any mining condition, *write for bulletin.*

Perfect mate to the 12-BU in thin-seam mining—the JOY 15" Chain Conveyor. Cut shows driving mechanism. Sections may be added for any desired length.

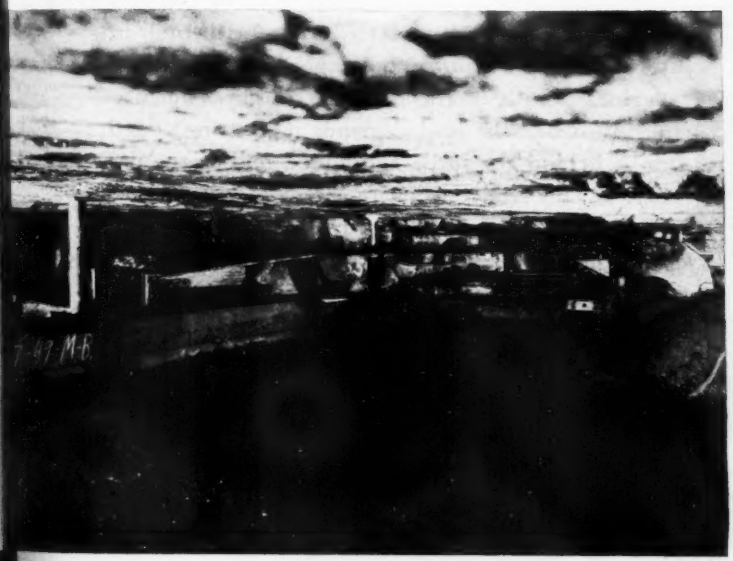
The 12-BU Loader working in a thin seam. The caterpillar treads are driven by individual motors. Permissible electric construction throughout... all parts in control system readily accessible.





The 12-BU Loader, showing the JOY gathering mechanism and the centralized controls for simple and efficient one-man handling.

The 12-BU, showing the JOY gathering arms loading at the face. Each arm is driven by an individual permissible-type electric motor.



The 12-BU loading in a thin seam. The entire machine has been ruggedly built for heavy-duty service and low maintenance.



Consult a Joy Engineer



JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

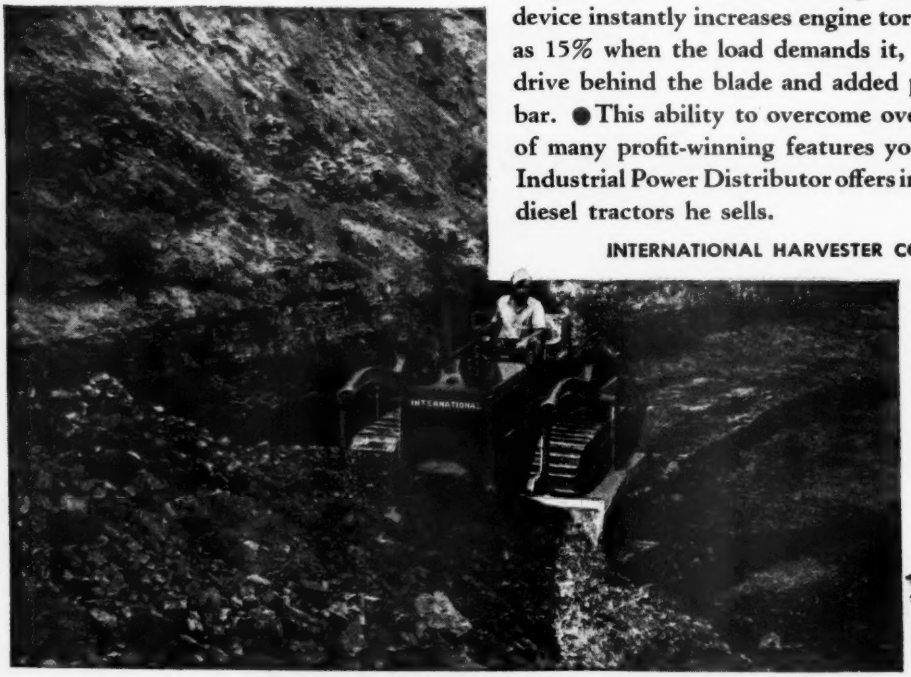
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SLEEPER

Hidden power to pull through heavy going gives every International diesel crawler the winning advantage in work capacity. ● Governors with built-in torque control assure a bulldog hang-on. This device instantly increases engine torque as much as 15% when the load demands it, putting added drive behind the blade and added pull at the drawbar. ● This ability to overcome overloads is but one of many profit-winning features your International Industrial Power Distributor offers in the International diesel tractors he sells.

INTERNATIONAL HARVESTER COMPANY • CHICAGO



For cleaning off overburden, building access roads, feeding shovels or pushing coal or ore to hoppers or chutes, International diesel crawlers excell. From the TD-9 shown here, to the mighty TD-24, you have a choice of four heavy-duty tractors to fit your needs.

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER



EXCLUSIVE
Roll Type Throttle Control

EXCLUSIVE
Push Button Air Bleeder Valve

EXCLUSIVE
Cylinder Mounting for Positive Safety . . . Longer Service Life

NEW Thor SINKER LEG

45% MORE FOOTAGE AT FAR LESS COST!

Here's real savings in labor . . . man hours . . . and drilling costs . . . and 45% more drilling footage by actual tests!

The miner can carry the entire setup—Thor Sinker and Thor Leg—into the smallest tunnel or closest corner, set it up in an instant, start the hole . . . and then let Thor do the work! All he does is control the *constant pressure* feed by operating two simple throttles—*the only automatic controls in leg operation!*

Think of the savings . . . both in operating costs and air consumption. With carbide bits the Thor Leg can replace drifters—and heavy mountings on scores of heavy duty operations . . . can drift in tunnels where drifters won't fit. Write today for catalog data.



FULLY AUTOMATIC—A quick, easy setup—just start the hole—set the leg at any angle between 30 and 45 degrees. . . the leg does all the lifting—all the constant pressure feeding . . . control the feed with a turn of the wrist!

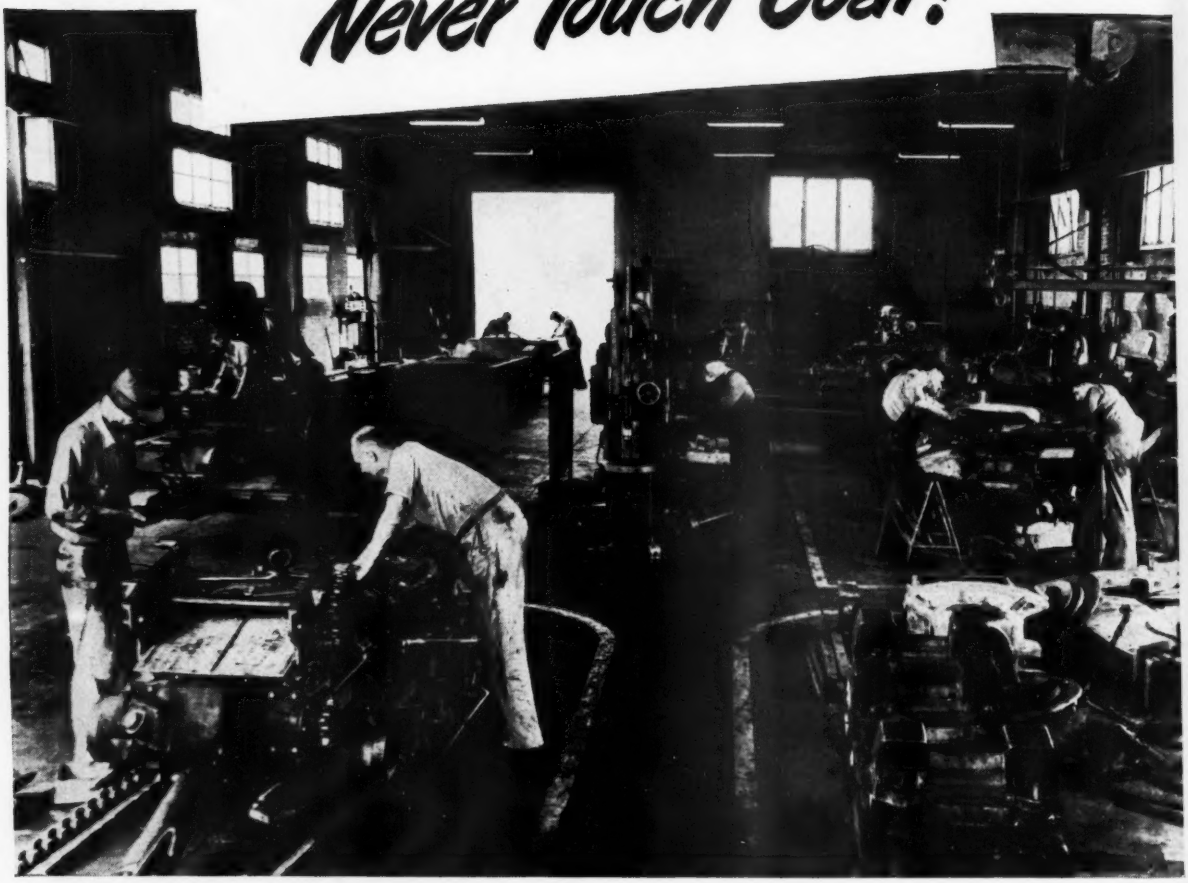
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Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

These Coal Miners Never Touch Coal!



Modern mine machinery is a 20th century marvel, and it's just good business to put its care in the hands of first-class mechanics and machinists. And good machine shops cost money, a lot of it. For instance, the one shown above, with its equipment, cost all of $150,000. It serves but a single mining operation.

Expenditures like this are necessary in modern coal mining, because today miners rarely touch pick and shovel. Instead, their hands operate the controls of machines. The "heavy work" is done by mechanized horsepower. A cutting machine, an automatic loader, and a shuttle car, whose combined cost adds up to a $60,000 coal mining team, must be kept in top shape to justify the heavy investment.

So mechanized mining, with its need for keeping machines in good running order, has created a new kind of "miner"—the machinist, the electrician, the welder, who keep mine horsepower on the go.

Modern mining practices are a far cry from those of "pick and shovel" days. Today mines are "blueprinted" in advance. Backed by facts learned from geological surveys, engineers can plan mine layout, without running into costly alterations due to unexpected faults in rock and seam formations.

Such planning permits speedy handling of coal from seam to surface for washing, sizing and grading in preparation plants. The result is mass production of many grades of coal, each especially adapted to efficient use in one or another of the many different types of furnaces in America's homes and industries.

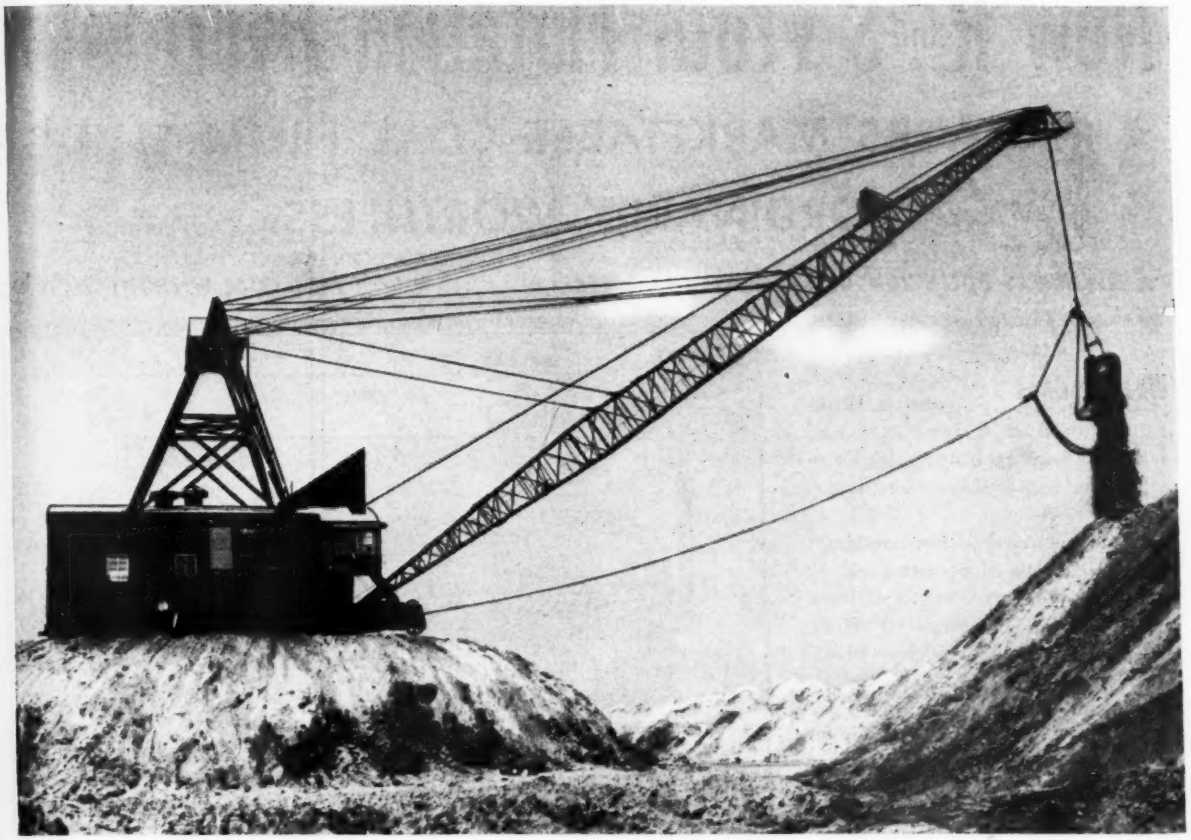
BITUMINOUS COAL

BITUMINOUS COAL INSTITUTE

A DEPARTMENT OF NATIONAL COAL ASSOCIATION

WASHINGTON, D. C.

BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA



An Appetite for Overburden

Where overburden is the problem, the answer is a Bucyrus-Erie walking dragline like the 7 to 10 cubic yard 9-W pictured above . . . for Bucyrus-Eries offer a line-up of job-proved features that mean big output wherever they go to work. Simple, sturdy design and construction mean reliable operation — important when working far from repair facilities. A dependable, strong walking mechanism means exceptional maneuverability, a smooth walking action without jerks or shocks — so Bucyrus-Eries can always work in the most effective digging and dumping positions, can move safely and surely over loose sand, soft ground, around obstacles. Long ranges and fast operating cycles mean big yardage capacities — the "appetite for overburden" that spells profitable operation. Bucyrus-Erie walking draglines are offered in a wide variety of bucket sizes and boom lengths to fit your job requirements.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

38M49

New R and S Froth Flotation Hydrotator

★ RECOVERS MARKETABLE COAL FROM SLUDGE ORDINARILY WORTHLESS

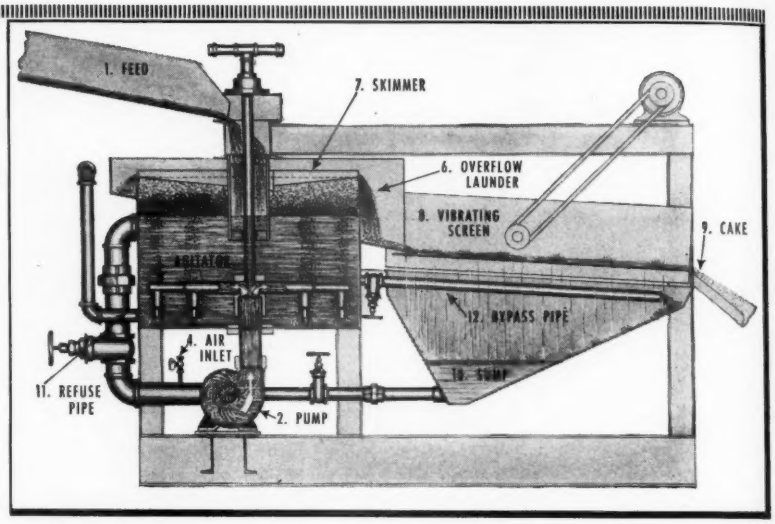
★ *MINIMIZES POLLUTION OF STREAMS AND RIVERS* ★ *RECOVERS COAL WITHOUT SETTLING*

What it Does

The new R and S Froth Flotation Hydrotator cleans and separates fine coal from sludge formerly considered of no commercial value.

It recovers coal without settling; yet the equipment occupies only a fraction of the space required by a thickener large enough to effect similar recovery by gravity. Froth is killed instantly and delivered in cake form.

Water is clarified and pollution of streams and rivers is minimized—important today in view of increasing government regulation on this point.



How it Works

1 After suitable conditioning, coal enters tank through Feed Chute and Feed Well.

2 Circulating Pump takes water from side of main tank and delivers it to tank bottom through . . .

3 Agitator, which distributes circulating water and coal uniformly over tank bottom, from where they rise to pump intake level.

4 Air is drawn into pump through a valve, is distributed over bottom with water and coal. Coal rises with air bubbles as . . .

5 Froth, which overflows into . . .

6 Overflow Launder, with aid of . . .

7 Skimmer, attached to rotating Feed Well and Agitator. Froth flows to . . .

8 Vibrating Screen, which "kills" froth and delivers it as . . .

9 Cake (low ash and dewatered). Water and entrained high ash coal, together with excess reagent, pass screen to . . .

10 Sump, where they join pump circulation and are returned to main tank.

11 Refuse, with all excess water from feed, is discharged from tank bottom by adjustable tube which controls level of water below frothing zone.

12 Bypass pipe to provide sluicing water.

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More Information

For complete details on this new Roberts and Schaefer equipment, for information on Testing Plant Service, and for competent counsel on your individual coal preparation operations, get in touch with R and S engineers. They can help you make prepared coal profitable coal.

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End "Social Convulsions"

LABOR'S so-called statesmanship has reached a new low in the current attempts at national sabotage. First coal, then steel, and now a threatened rash of strikes in other industries are grinding off the index of industrial activity.

Coal production ceased shortly after the president of the United Mine Workers asserted that failure of some coal operators to continue payments into the union's welfare and retirement fund would produce "social convulsions." By this statement the leader of the coal miners indicated his awareness of the results of nation-wide strikes. Yet, despite the nonexistence of a contract, default was claimed, and a "no-day work week," or in English, a strike, was called. In the face of deliberate UMW procrastination on the matter of negotiating a new contract, the absence of a contract is given in some quarters as the reason for the strike. More feeble excuses on which to base a work stoppage would be difficult to conjure.

In their absorbing task of demonstrating their great power, made possible by special immunity under the anti-trust laws, union heads have become disdainful of the costly chaos their methods create. Instead of bargaining, the unions have resorted to the practice of flexing their economic muscles to bludgeon employers with one ultimatum after another—and the public be damned.

There must be a better way to settle employe-employer differences than by nation-wide strikes that repeatedly mean losses to labor, management, stockholders, and the public. A recent survey shows that the 17 major coal strikes staged since 1940 have caused the cost of coal at the mine to zoom to an average price of $4.90 a ton or nearly twice the 1942 price. Coal use has fallen to a low of 44.3 percent of the total mineral fuels consumed and coal mining as a job has offered little in the way of steady income. Since the end of World War II strikes have caused bituminous coal miners to lose more than $750,000,000 in wages.

Strikers have put out the fires in steel plants thereby giving air line passengers unusually clear views of Pittsburgh and other steel producing centers. The outcome of the steel strike is much less clear as the union has taken an adamant position against the established principle of employe contributions to pension plans.

This intolerable situation in coal and steel exists because the monopolistic power held by union leaders enables them to deal with the respective industries on a nation-wide basis. No regard is given to the special circumstances or local conditions which make one company competitive with another in matters of production, pricing, research and marketing. The Presidential fact finding board, which recently scratched the surface of the steel industry problem, admitted the board's incapability of judging the question on a national scale. However, it did come up with a particularly good recommendation that would tend to eliminate monopoly powers of huge unions and the repetition of industry-wide strikes. "... There should be a return to collective bargaining in order to provide an opportunity to each company to prove that the considerations, conclusions and recommendations herein discussed are in fact not applicable to it.

"As a result (of industry-wide bargaining) there is frequently little or no serious bargaining or discussion between most of the individual employes and the union.

"This practice is clearly a variation from the accepted concepts of collective bargaining as defined in the statutes and interpretations; it tends to promote a feeling of dissatisfaction and disharmony between the parties which makes cooperation difficult."

Putting this suggestion into effect would return a high degree of lost freedom to the local union and the individual employes, who would gain the opportunity to discuss their needs and desires with their immediate employers. Labor-management problems differ in every steel plant and in every coal mine. The terms acceptable in one operation frequently fail to suit another. A return to collective bargaining on a unit basis would benefit all concerned and paralyzing nation-wide strikes would be eliminated.

That collective bargaining on a unit basis will return to the domestic scene, we have little doubt. But the first step is repeal of the statutory provisions that exempt the heartless monopoly of human labor from the laws dealing with monopolies. Awake to this desperate need, the American people must enjoin this Congress, or one that will, to pass statutes to forever end labor monopoly.



Bucket rotates to pick up 1/3-cu yd load



While one loaded mucker moves up the shaft, the other is being lowered

Sinking Bunker Hill's Auxiliary Inclined Shaft

Unique Unit Loads and Hoists Muck

By STANLEY W. McDOUGALL

JOSEPH E. GORDON

Mine Superintendent and Assistant Mine Superintendent
Bunker Hill & Sullivan Mining & Concentrating Co.

SOUTHWEST of Kellogg, Idaho, in the Coeur d'Alene Mining District, is the Bunker Hill Mine, owned and operated by the Bunker Hill and Sullivan Mining and Concentrating Co.

Planned development at the mine called for deepening the Auxiliary Shaft 1100 ft. It is a three-compartment inclined shaft — two hoisting compartments and a manway compartment — inclined at 50 deg from the horizontal and bearing south 42 deg 16 min west. The Auxiliary Shaft is offset from the main or No. 1 shaft and parallels the No. 1 shaft in dip and bearing. The collar of the Auxiliary Shaft is on 21 level, at elevation sea level, and the bottom before the present sinking was 30 ft vertically below 23½ level. Consecutive whole numbered mine levels are 200 ft apart vertically.

In the sinking operation, the hoist installed for handling development rock and ore from the 23 level was used. At present the 23 level is the lowest ore-producing level. The underground hoist has two drums, each 4 ft in diameter and with a 4-ft face, winding at the present time 2200 ft of 1-in. preformed wire rope on each drum. It is powered by a 2200-v, 250-hp a-c motor. Equipped with air-operated, multiple-toothed clutches, friction brakes, dynamic braking, and direct current control, the hoist has a maximum rope speed of 800 fpm.

Muck is hoisted in counterbalance in two 54-cu ft skips, which dump into a 200-ton capacity pocket above the 21 level. Waste from the shaft is used for filling in the Bunker Mill square-set stoping system.

Taps Deepest Horizon in District

On November 1, 1948, sinking of the Auxiliary Shaft began at an elevation of 530 ft below sea level; on July 22, 1949, the shaft was bottomed at an elevation of 1370 ft below sea level. The distance sunk, 1100 ft on the slope of the shaft, makes the Auxiliary Shaft the deepest shaft in the district below sea level. Two stations were cut during the sinking period—a 25-level pump station at elevation minus 835

ft, and a 25½ mucker dump station at elevation minus 913 ft.

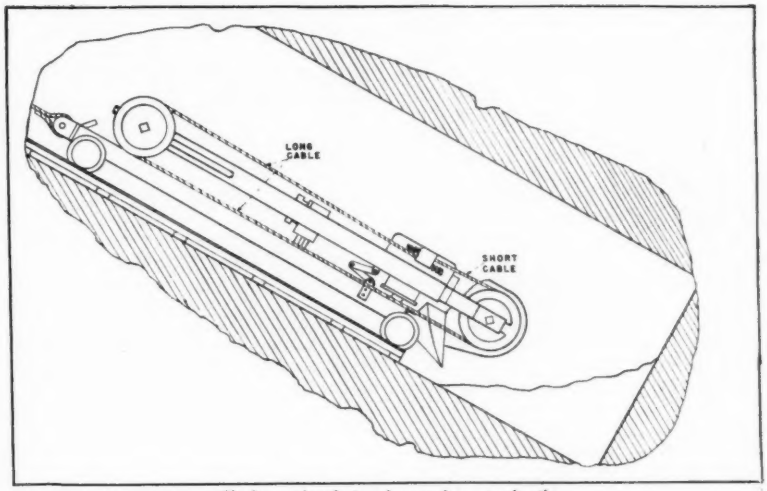
During November and most of December 1948, only one or two shifts a day were worked in the shaft. On December 27, 1948, sinking was started on a three-shift per day basis and working a six or seven day week. The sinking crew consisted of a shaft boss, twelve shaftmen, three hoistmen, and two mechanics. Part of the time one or two skip tenders were assigned to the shaft. Actual working time per shift was about six hours.

Rock penetrated in sinking were the quartzite beds of the Revett Formation of the Belt Series, a series of Pre-Cambrian, metamorphic, sedimentary rocks, which comprise the major portion of the rocks in the district. The beds varied in hardness and ranged in thickness from paper-thin and seams to massive quartzite beds up to 2 ft thick. The strike of the beds is north 60 deg west, dipping 70 to 85 deg to the south. The strike of the beds was thus very nearly parallel to the strike of the long dimension of the shaft. Considerable trouble was experienced with overbreak and slabs in the back in the lower dipping bed. Only one vein was encountered. It is a lead-silver vein, 2-7 ft thick, striking south 45 deg west, and dipping 20 deg to the south. It is probably the Mac vein, which is being mined at present above the 23 level. The vein was crossed at the minus 600-ft elevation.

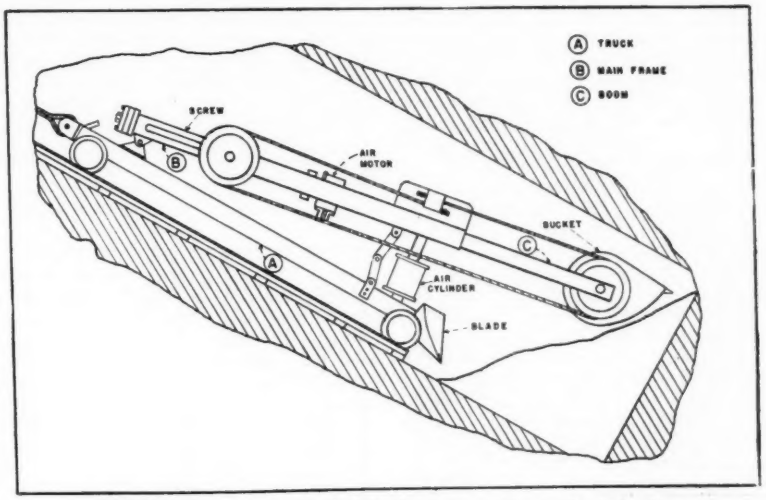
On the average, the outside shaft section is 9 by 17 ft. The two hoisting compartments are 4½ by 5½ ft in the clear. Forty-pound rails are used for the 40-in. gauge track in each hoisting compartment. The manway carries a 6-in. air line, a 6-in. pump line, a 2-in. water line, and a 20-in. ventilation air line, and the necessary signal and power cables. Spaced on 6-ft centers by eight collar braces, 6 by 6 in. in cross-section, the sets are lagged on the sides and back with 2 by 10 in. boards, 6 ft long. Seven-eighth inch diameter rods were used to hang the sets. Each set was placed on line and grade with a transit.

Ventilation air was forced down the shaft through the 20-in. diameter ventilation pipe by a TMS fan on 23 level. Warm air taken from a ventilation split in the main return airstream of the mine and cooled by a Carrier spot cooler was furnished to the intake of the fan. Rock temperature was in excess of 90 F but there was no particular discomfort as long as the ventilating system was working.

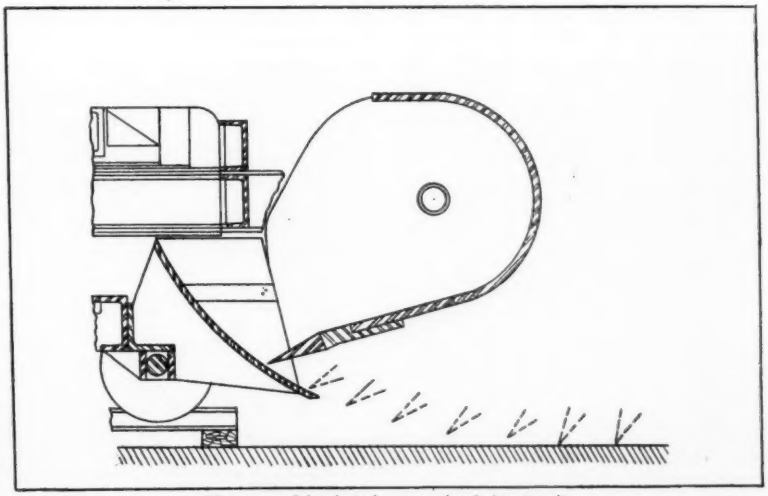
From 10 to 20 gpm of water ran into the bottom of the shaft. In the bottom an Ingersoll-Rand No. 35 air-driven pump was used to pump the water into the 6-in. pump line in the manway. Two portable 500-gal tanks with an Ingersoll-Rand 10-hp Motorpump mounted below each tank were used to relay the water to a large sump on 23½ level, where two 10-hp Motor-



Shaft mucker being lowered to muck pile



With boom raised and extended, bucket is in position to begin loading


Close-up of bucket shows path of digging lip

pumps pumped the water to the 23 level into the mine pumping system. A portable tank and pump were always kept less than 150 ft vertically above the air-driven pump in the bottom. Two impellers, 110-ft head and 220-ft head, were used interchangeably in the portable pumps. By moving the pumps successively down the shaft and using a suitable impeller, the two tanks and pumps were used until the 25-level pump station was cut. There, two 25-hp, 375-ft head, motorpumps were installed with three 1000-gal tanks for storage. The two portable tanks and pumps then were used below this station in sinking the shaft to the bottom.

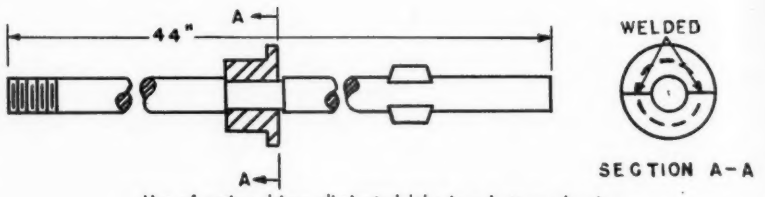
To insure the close cooperation needed between the hoistman and the shaftmen in the bottom in using the shaft muckers, a voice intercommunication system was installed in addition to the regular signal system. The master speaker with the controls was located at the hoist, and a portable speaker was carried in the bottom of the shaft. Although installed primarily for use in mucking, the speakers were used in all the operations and proved a valuable aid in speeding up every phase of sinking.

Casing Drivers Facilitate Drilling

Each shaft round consisted of 44 holes, breaking to a middle V-cut. The pattern of the round was four rows of holes on each side with seven holes in the inside or cut row and five holes in each of the three outside rows. Drilling time was three and one-half hours.

Two I-R, DA-30, power-fed drilling machines were used for drilling. These machines were equipped with automatic air-water backheads, sliding cones, and had a feed length of 30 in. A pneumatic bar, 9 ft long and 3 in. in diameter, was used to support each of the drills. The bars were placed horizontally across the short dimension of the shaft, one below each outside compartment. With a steel stinger on one end, the other end of the bar was equipped with a swinging foot which fitted into a shoe nailed to a lagging or the sill and kept the bar from rotating. A complete round was drilled from one setup of the bars. The bottom was carried level to facilitate the cleaning of the bottom with the shaft muckers. Drilling rods were 1⅛ in. round, lugged, hollow, alloy drill steel.

Casing cut from old 2-in. pipe was used to start nearly every hole. Casing is usually placed by hand; an innovation was the driving of the casing with the drilling machine using a special drill rod called a "casing driver." The casing driver is a 44-in. drill rod with a flanged collar attached to the rod. Since four different lengths of casing were used—12, 18, 24, and 30 in.—it was necessary to have a casing driver for each different length. A 1⅞-in. regular Jackbit was used on the casing driver, and the collar was placed on the rod so that this bit would stick out ½ in. below the casing.

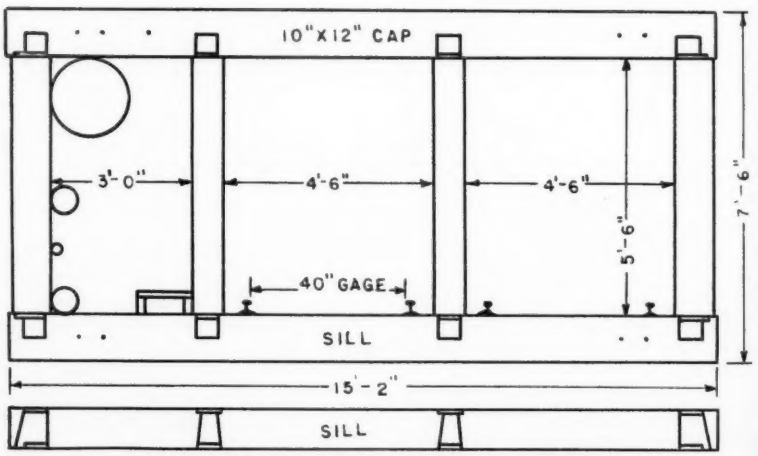


Use of casing driver eliminated laborious bottom cleaning

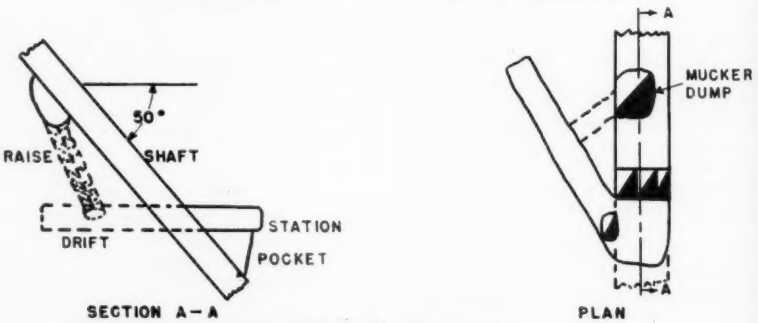
To start a hole, a 2½-in. regular Jackbit on a 44-in. drill rod was drilled through the loose muck and several inches into the solid rock. The proper length casing, depending on the depth of the loose muck and fractured rock, was then driven into the casing hole. Where the ground was not too hard the casing was seated with the casing driver without drilling a casing hole. The use of casing made it unnecessary to clean up the bottom of loose muck or pick and moil the fractured rock from the bottom. By using the casing driver the casing was seated easier and faster and with less damage to the casing. Over 75 percent of the casings were reused.

After the casing was seated, the hole was drilled with 1½-in. gauge, Carset bits, using stud connector drill rods in 42, 72, and 103-in. lengths. The Carset bits were used until the cutting edges were dulled to a ⅛-in width and then withdrawn from the shaft. Dull bits were resharpened and then used in other parts of the mine. No trouble was experienced with loss of gauge. However, all new bits were placed on the shorter steel. Each Carset bit drilled about 115 ft of hole before being withdrawn from the shaft.

All drilling equipment was carried on a drill tender which was lowered in the manway skip compartment to the bottom for drilling the round and hoisted after the round was drilled and placed on a station. Air for the machines, air-bars, and blowpipes, and water for the machines was furnished from an air-water manifold on the bottom of the drill tender. A 50-ft, 1½-in. hose supplied air from the manway air line to the manifold; a ¾-in. hose supplied water from the shaft water line to the manifold. During



Inclined shaft set provides for two hoisting compartments



The 25½-level dump and station

drilling, the drill tender was unhooked from the skip and chained in the shaft; both skips were then free, and the muck from the previous round was hoisted from the shaft pocket where it was stored. After every round, all equipment on the drill tender was inspected and put in shape for the next round.

Blasting System

After the round had been drilled, the holes were blown clean with air and each hole loaded with six to eight sticks of 50 percent special gelatin dynamite. In the hard, thick-bedded quartzites, 60 percent special gelatin dynamite was used in the cut holes. The primer cartridge, containing an electric delay blasting cap, was placed in the bottom of the hole. Ten delays were used. Lead wires from the individual blasting caps were wired in series and the two end wires of the series were connected to a 220-v blasting line in the shaft. The round was blasted from a locked blasting switch carried in the manway at least 300 ft from the bottom. The round was loaded and blasted as soon as it was drilled. The smoke cleared out of the shaft in about a half hour.

To protect the cap of the timber set, which was the only member usually broken when blasting, a 10 by 12 in. blasting timber 12 ft long was bolted to the bottom of the cap.

Special Unit Mucks Shaft

In preparation for sinking the shaft, an investigation was made of various types of mechanical muckers, but none were found to be suitable for mucking an inclined shaft. A machine was therefore designed and built at the Bunker Hill Mine for mucking the Auxiliary inclined shaft. The basic principle of operation and design of this shaft mucker was developed by Stanley W. McDougall, mine superintendent.

In operation the machine fastened to the main hoisting rope and ran on the 40-in gauge track. Two machines were used in mucking, one in each hoisting compartment. Each shaft mucker picked up a load of muck off the bottom, carried it up the shaft and dumped its load through the track into a raise under the shaft. The muckers were operated in counterbalance; when one mucker was loading, the other one was dumping.

As finally developed, the Bunker Hill shaft mucker is a large, heavy machine 16½ ft long, 49 in. wide, and 44 in. high, and weighs 8000 lb. Its principle of operation is that of a pivoted scraper or bucket which is rotated down through the muck to load, together with suitable mechanism for placing, rotating, and carrying the bucket. The machine consists of four main parts—a truck, the main frame, the boom, and the bucket.

The truck is a rectangular frame mounted on four wheels with a wheel base of 10 ft. Bolted to the lower end of the truck is a sloping steel blade with short side plates similar to a bulldozer blade. On the upper end of the truck is a seat for the operator and a clevis for fastening the mucker to the hoisting rope.

The main frame rests on the truck and is fastened at the upper end to the truck by a hinge. Sliding within the main frame is the boom, which is moved in and out by a large screw and a 14-hp reversible air motor fastened to the main frame. Mounted between the main frame and the truck is an 8-in. diam air cylinder, which serves to raise the main frame from the truck. Mounted on the main frame at the upper end are two four-way valves, which control the air to the air motor and the air cylinder. A 1-in. air hose, connected by a quick change connector to piping on the shaft mucker, supplies air to the two valves. To prevent damage to the moving parts from the 28,000-lb thrust of the screw, automatic cut-offs shut off the air motor at each end of travel of the screw.

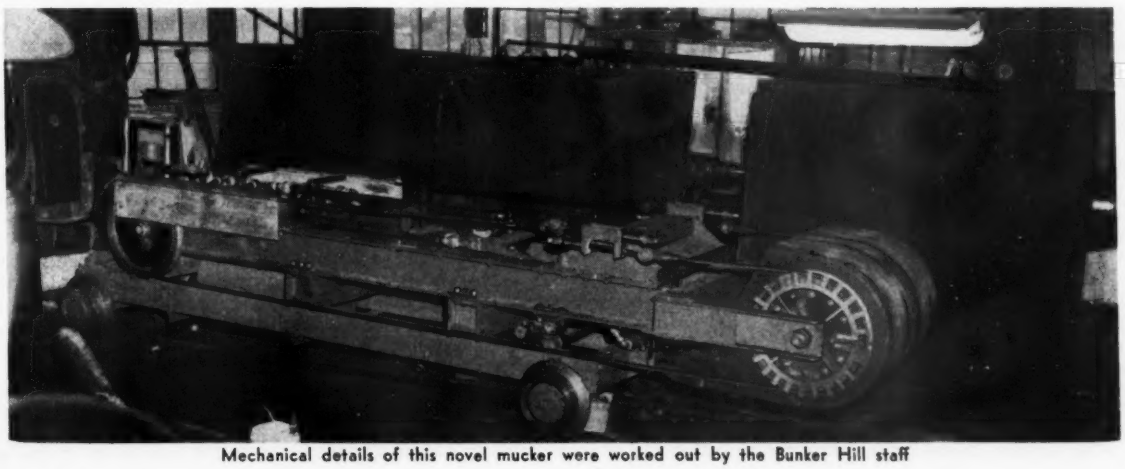
Pivoted between two arms at the lower end of the boom is the bucket; it is 36 in. wide and 36 in. long with a volume of 20 cu ft. The bucket is a half-round shape with a straight projecting lip, and straight sides. For digging, six manganese steel teeth are fastened to the lip. Bolted to the sides of the bucket are two double-grooved sheaves. Two short ¾-in. diam wire cables, one fastened on each side of the main frame by an adjustable eyebolt, are brought down and over the outer groove in the fixed sheaves on the bucket and fastened by sockets to the sheaves. When the boom moves out or down, these two short cables cause the bucket to rotate to the open position Two long ¾-in. cables, fastened to the main frame in the same manner as the short cables, are brought up and over two free sheaves which rotate on two short axles fastened to the upper end of the boom—one on each side. The long cables are then run down and around the inner groove in the fixed sheaves and fastened to the fixed sheaves by sockets. When the boom moves in or up, the two long cables cause the bucket to rotate to the closed position. The bucket can be rotated through a 180-deg arc.

Mucking Operations

After a round had been blasted and while the smoke was clearing, the skips were taken off and the muckers put on. When the smoke had cleared the four-man crew rode the muckers to the bottom. The muck pile was wet down, and the slide rails were dropped on the muck pile. Each slide rail consisted of a regular 30-ft, 40-lb rail with an 8-in. H-beam, 17 ft long fastened securely to the lower end. While loading at the bottom the mucker wheels ran inside the flanges of the H-beam.

With the bucket in the open position, the operator stepped onto the mucker, connected the air hose, and

(*Continued on page* 46)



Mechanical details of this novel mucker were worked out by the Bunker Hill staff



A close up of the cutting heads

Colmol In Operation

This Combination Machine Which Cuts and Loads Coal Without Blasting Is Now on a Production Basis and Is Proving Successful in Meeting Operating Requirements

By W. J. PHILLIPS
Assistant to President
Sunnyhill Coal Company

FOLLOWING the Coal Show in Cleveland this past May, the experimental model of the Colmol which was on exhibit there has been in productive operation at the Sunnyhill Coal Co.'s mine located at Reedsville, in northern West Virginia. Previous to the Show, the machine had been working in this property primarily for experimental and development purposes, and had demonstrated its practicability as a combination unit, cutting and loading coal from the solid, without blasting.

The present model, which makes a cut 9½ ft wide and approximately 4 ft high, is mining the Upper Freeport seam, taking 51 in. of coal above a 10 to 12-in. hard clay bottom and leaving an overlying 18 to 20-in. of bone for roof support. With only a maximum of 150 ft of cover, excellent roof has been encountered which has required very little timbering; this condition, of course, may be largely attributed to the absence of shooting and the arched pattern at the top of the rib left by the upper row of cutting heads. Included in the 51 in. section of the seam being mined, is a clay binder approximately 3 in. thick which the machine brings out in sizeable chunks that can be readily picked out at the tipple. The coal is of a woody, fibrous structure with no natural cleavage planes; this factor causes the cutting bits to be in constant contact with the coal, whereas a hard structure material would fracture out somewhat ahead of the bits, providing intermittent relief.

Mining Method

To date development work only has been done with the Colmol, driving a system of three main headings. It is the plan to push these through to the far end of the property line and when this point is reached, the area thus developed will be mined retreating, probably using the room and pillar system. The entries are driven 12 ft wide on 60-ft centers with crosscuts, also 12 ft wide where roof conditions permit, turned on an angle of 45 degrees every 70 ft. One machine drives the three entries, working one heading at a time and alternating between the three places so as to provide breakthroughs for ventilation.

The present operating system is shown in the sketch on the following page. The machine first cuts ahead a distance of 15 to 20 ft, taking the full 9½ ft width; it is then retracted to the beginning of the cut

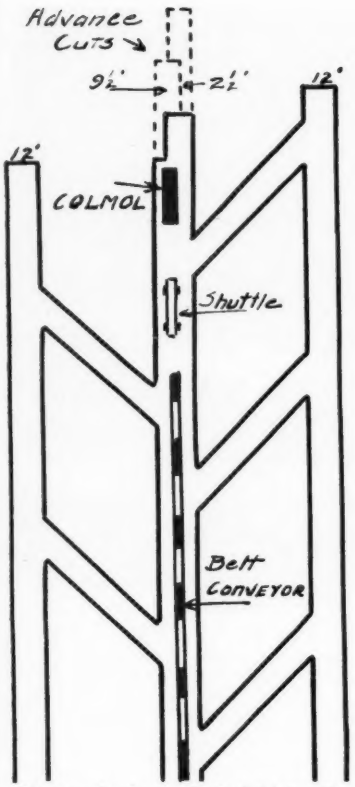


Diagram showing method of driving 12-ft entries in main heading development

and again advanced, taking a 2½-ft cut on one side up to the face, thus making a 12-ft entry. This cycle is repeated by continuing to cut straight ahead for another 15 to 20 ft, taking a full 9½-ft width and again retracting to take a 2½-ft lift on the other side. Thus, for every 30 to 40 ft of forward advance the machine need be backed up only once. When taking the side lift or offset cut, the rate of advance is nearly twice that made when taking a full width cut and with this increased mining speed, production loss due to not having all cutting heads in the coal is partially made up. This method of advance has proven satisfactory operational-wise. It allows room for timbering and gives accessibility to the front of the machine for bit inspection. Temporary roof jacks or posts can readily be placed while the machine is working. From the 12-ft entries, 45 deg crosscuts can be easily turned off.

The dust problem at the face is handled by a series of water sprays mounted on the front of the machine and directly over the conveyor. Compound M is added to the water which is pumped into the spray system at 125 psi and sprays approximately 4 gpm of operation. The mine is nongaseous so no problems have been encountered with that hazard.

Haulage

Haulage is by shuttle car from the machine to a 30-in. Jeffrey belt conveyor which serves as the main line, transporting outside to the tipple. This belt is extended at 150- to 200-ft intervals as the entries advance in order to reduce the shuttle car haulage distance to a minimum. The extension is made on the off-shift so as not to interrupt coal production, but at times the rapid rate of driving is such that an entry will be advanced during a shift beyond the desired 200-ft limit. A trailing cable 300 ft long is provided on the machine to take care of this situation.

Two shuttles are used for service haulage from the machine to the belt. The present practice has been to keep one shuttle car stationed at the loading boom discharge as a surge bin while the second car shuttles to and from the belt. Although in some cases it has been found time-saving to have the surge buggy leave the loading boom and meet the second car en route. This is particularly advantageous when the haulage distance is over 200 ft, but even so, a great percentage of the non-productive time in the daily operation of the unit is due to the inability of the haulage system to adequately move the coal produced by the machine. Time studies have shown the machine to be digging in the face only 1½ minutes out of every four, due to waiting for return of the empty shuttle car which means that the unit is actually only producing coal approximately 37.5 percent of every four minute loading cycle. To date haulage is our serious problem and is a major factor to be considered in obtaining the maximum tonnage per shift.

The main feeder cable and junction box for the Colmol are advanced periodically during off shift. This allows the 300 ft of trailing cable to be hung along the rib where it is protected from damage by the shuttle cars. The 250-v, d-c current is supplied from four 75-kw Diesel generator sets hooked in parallel. These are mounted on a trailer located near the pit mouth.

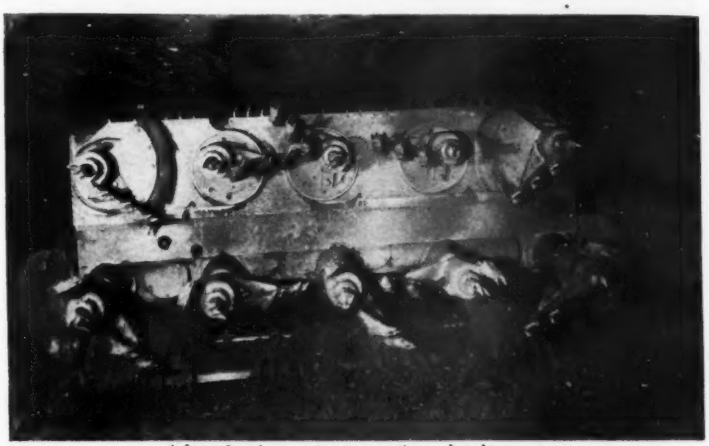
Operating Results

The face crew consists of five men, the Colmol operator, utility man, two shuttle car operators and a timberman. The shuttle car operators and

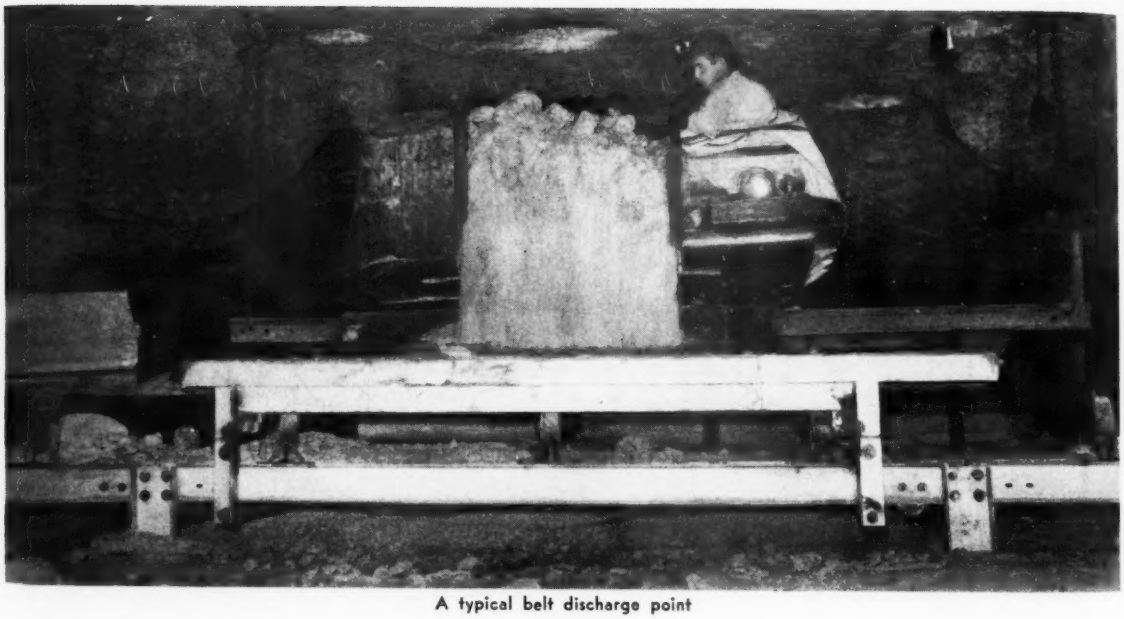
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Operator at loading end is in safe position



Advancing into entry to continue development



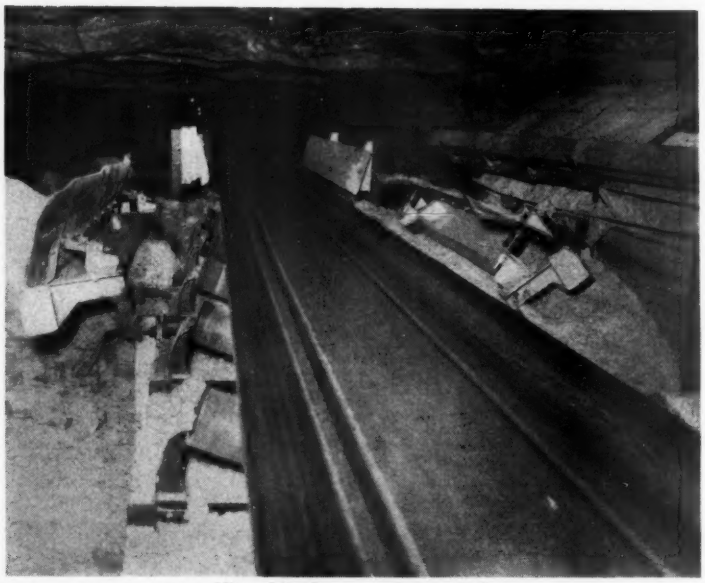
A typical belt discharge point

Belt Conveyors for Gathering Haulage

Underground Installation Handles Abrasive Potash Ore Over Rough Terrain

By RUSSELL G. HAWORTH, R. R. KNILL, and JAMES EDMUNDS

Respectively Assistant General Manager, Mine Superintendent, and Mine Development Engineer Potash Company of America



Hinged loading aprons serve belt

IN late 1947, the decision was made to substitute belt conveyors for gathering locomotives and cars in one extraction panel. Several compelling factors influenced thinking in arriving at this decision.

The potash bearing bed being mined is situated at a depth of 700 to 1100 ft below the surface. Several hundred feet of salt beds lie above and below the sylvinite bed which is an intergrowth of potassium chloride and sodium chloride crystals. The commercial portion of this bed extends over several square miles, requiring an extensive underground haulage system. Haulage entries are driven in the ore horizon, except where main entries are regraded to maintain a grade of not over 3 percent. Grades in cross entries and in extraction panels may be as much as 12 percent. As a room and pillar system is used, and all ore is blocked out in 1100 by 1800-ft panels between the chain and barrier pillars, haulage within the panel is necessarily up and down the grades created by nature and the mining engineer who laid out the mining plans on a map with a few projected contour lines for a guide. The engi-

neer also designates three gathering haulage tracks through the panel before mining is started.

Terrain Indicated Superiority of Belts

Rough terrain was the first compelling reason for everyone to agree that belts would be superior to locomotive haulage. They would eliminate over one mile of track in each panel, would travel up and down grade with no difficulty and would not get off the track. Since some panels contained ore which was relatively thin, under 6 ft, it would have been necessary to brush salt from the back or the bottom in order to maintain headroom for locomotives and loaded cars. Cost per panel for installation of three tracks with the grading and brushing required ranged from $20,000 to $30,000, not including the cost of supplies and labor for salvage and removal of the track when mining was completed.

Since the company was expanding the productive capacity of the refinery and the mine in 1948, it was decided to substitute conveyor belts for the old type of gathering haulage in the new panel operation which would be needed to produce the additional ore.

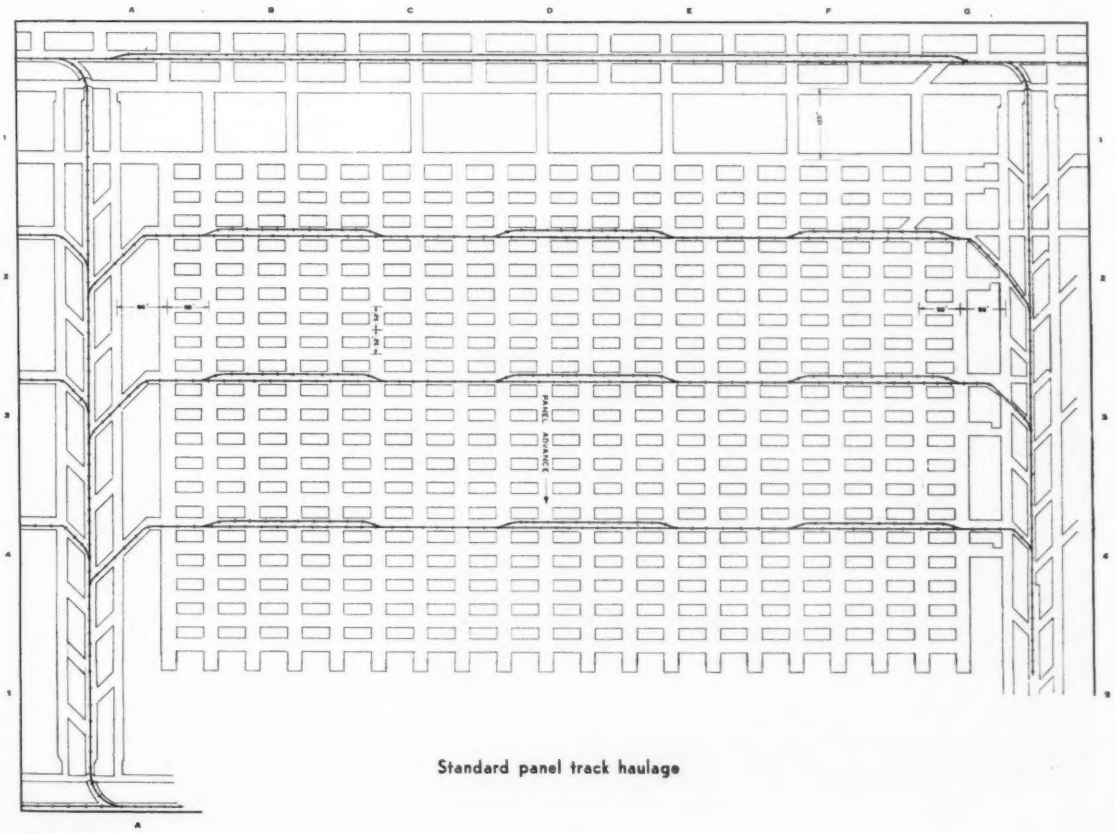
Coal mines had been using conveyors to an increasing extent year by year and many problems had already been solved by them and by the manufacturers of such equipment. Information from such sources was of considerable assistance.



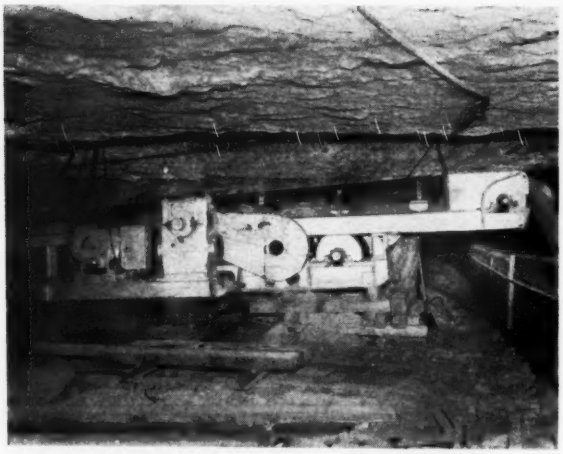
Loading cars for main line haulage

Each belt is approximately 800 ft long and will be installed to discharge into cars in one cross entry where much attention has been given to layout of the double track and crossovers.

After blasting, the ore is loaded by



Standard panel track haulage



Cribbing is employed to adjust belt head



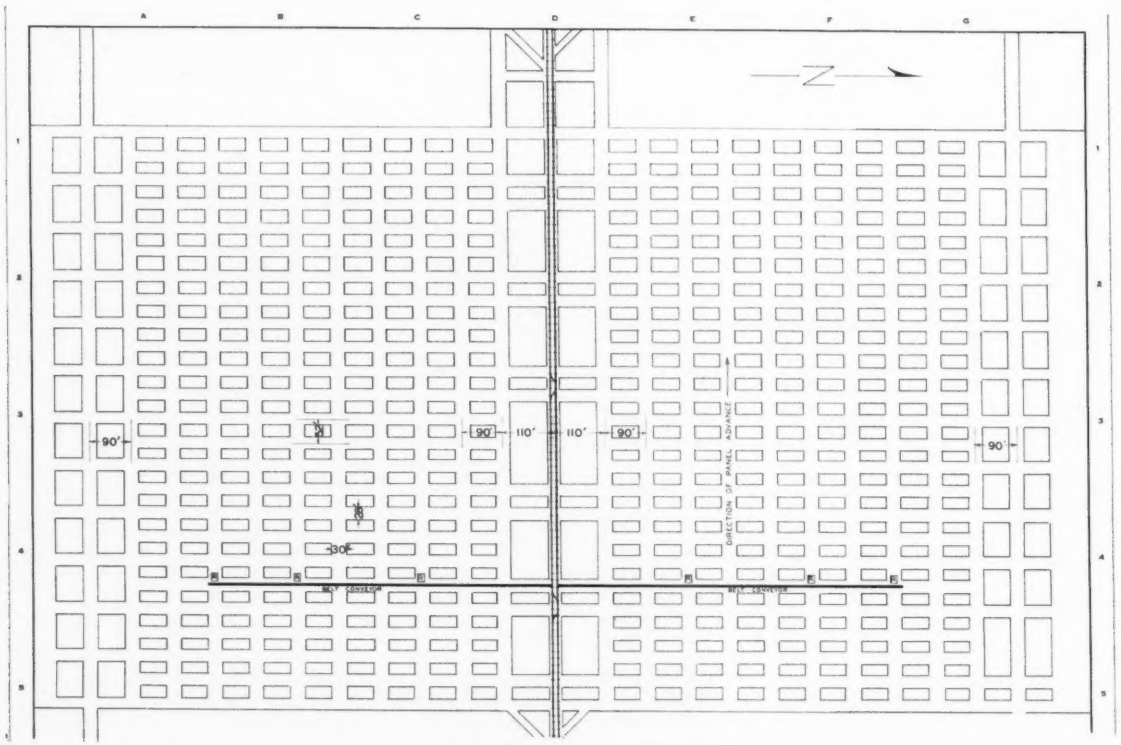
Special dollies move conveyor sections

a caterpillar-mounted loading machine into shuttle cars. The shuttle cars are driven to one of three loading stations where they are discharged onto the belt. Ore is dumped from the shuttle car by driving on a ramp to a point where the ore will fall on an inclined plate, from whence the material slides onto the belt. The plate is hinged in order that it may be swung out of the way when any of the other loading stations are being used. The loading station aprons are also hinged for the same purpose. Belt speed is a little over 300 fpm. This allows the shuttle car operator to discharge the load in approximately half a minute. It is relatively easy to alter the shuttle car discharge speed by choice of the proper sprocket so that the operator does not have to start and stop the conveyor in the shuttle car in order to prevent overloading of the belt.

A push button switch is provided at each discharge station so the shuttle car operators may start or stop the main belt conveyor at any time. A signal system is also provided so that he may signal the man at the belt head who loads the cars.

Belt Operation Improves Panel Efficiency

At the belt head one motorman is employed for operating the belt and loading ore into mine cars. Remote control for a hoist or a locomotive is installed near the belt discharge point. The capacity of the shuttle cars is the same as the mine cars, so the motorman moves the trip slowly as the belt



Model panel for belt conveyor haulage

is discharging. When the car is full and no more material is coming on the belt, he moves the next empty car under the belt head. Since there is a minimum of 30 seconds between discharge of one shuttle car and the succeeding one, there are few spills and no diverting or transfer chute is required at the belt head. Trips are loaded for the main line motor which hauls the ore to the dump at the shaft. The net result is that one man can operate the gathering haulage system, where four men were required before on two locomotives. Men replaced by this equipment were transferred to shuttle cars to provide greater capacity on that end of the operation or were transferred to development.

Panel crew efficiency has been increased about 20 percent. Under the production bonus system, half of the increased efficiency is translated into higher earnings for the entire group participating in the bonus. Much dead work in brushing and track has been eliminated, and this is of benefit to the company and the employes. The hazards of operation of locomotives in panels under sometimes adverse conditions have been eliminated in this type of operation.

Moving Conveyor Installations

Many methods of moving the belts and conveyor sections were considered and several ideas have been tested. The conveyor must be disassembled and moved ahead to a new position where the faces have advanced 250 ft. It is set up again, full length, parallel to the panel face, and in the second room back from the face. In order to prevent the complete shutdown of the section while moving, two 800-ft conveyors were purchased instead of one 1600-ft conveyor. Operations proceed in one half of the panel while one belt is being moved ahead.

In order to move the belt safely and quickly, reels were made to fit on low track trucks. When the belt is to be moved, one splice is broken at the belt head and one end of the belt is fastened to the reel. With the tandem drive on the head the belt can be fed off the conveyor by power. The reel is now turned by hand but plans are being drawn to provide a gearmotor drive. Some 1550 ft of belt is run off onto four reels and one section of 35 ft is left on the belt head drive because it is difficult to thread the belt in the tandem drive. The trucks with the belt reels and belt are then sidetracked until needed.

The belt head drive sections weigh approximately 8000 lb. These are hoisted a few inches with chain blocks, the timber cribbing is removed and the section is lowered onto a special truck. The belt head is hauled about 250 ft to the next location and wheeled into place, hoisted up by chain blocks, and fastened into position. Then cribbing is built under the head. Moving this section requires about one shift; including removal of the belts. The conveyor pans are disconnected one at a time, starting at the belt head. As soon as the head section has been set, one reel of belt is connected to the short length left in the drive pulleys. Using a shuttle car for power, this length of belt is pulled out behind the head section, the conveyor pan sections erected over the belt and the return idlers put into position under it.

A small dolly consisting of two rubber-tired wheels and a special high clearance axle is wheeled by hand into place over the center of the conveyor pan section. Two clamps are suspended from the axle by bolts and these are fitted under the frame and the pan is lifted up into position firmly against the axle by tightening two nuts on the suspension bolts. This eliminates lifting of the heavy (450 lb or 380 lb) section, preventing many sprained backs and mashed toes. A shuttle car is used to haul the pan, with the dolly attached, to the new location. Several dollies have been made so that it is not necessary for the shuttle car operator to wait until the pan is removed from the dolly. He hauls an empty dolly back after the first trip, picks up another one which is loaded and leaves the empty

(*Continued on page* 41)



Truck-mounted reels move belt



Diverting chutes load ore in direction of belt movement

More About Blasting Raise Rounds

Tests with Millisecond Delays and No Cut Holes Indicate Possible Savings

By WING G. AGNEW
Chief, Mount Weather Branch
Mining Division, U. S. Bureau of Mines

This is a continuation of the article, "Blasting Raise Rounds with Millisecond Delays," which appeared in the April issue of MINING CONGRESS JOURNAL describing the first five experimental raise rounds being conducted at the Mount Weather Testing Adit, Mining Divison, Bureau of Mines.

AS stated earlier, these experiments are being conducted while driving a 6 by 10-ft vertical ventilation raise which will eventually extend 233 ft from the adit rail to the surface. The previous article described the steps taken in the development of the no-cut-hole rounds blasted with millisecond delays and concluded that the damage to raise timbers might be reduced by the fineness of the fragmentation and the lessened concussion obtained with the use of millisecond delays.

At the time it was not fully realized that, although the muck was much finer than obtained with ordinary delay blasting, approximately 25 tons of rock was cut loose in 0.075 second when zero, A, and B delays were used, and in 0.125 second when zero, A, B and C delays were used; in addition to being aided by gravity, it had a propelling explosive charge behind it which perhaps acts somewhat like a charge of shot in a shotgun barrel. The timbering divides the raise equally between a chute compartment and a manway compartment; the manway-compartment side is timbered with 8 by 8-ft square-sawed oak timber sets, and the chute compartment is lagged with 3 by 6-in. oak planks on the manway side, leaving three rock walls on the other sides.

In each of rounds 6 to 10, inclusive, at least one cap and one or more posts of the top set were broken, and the manway covers consisting of a double layer of 3 by 6-in. planks were broken badly enough to allow 2 to 10 cars of muck to come down the manway.

After round 10 the size of the timber was increased to 10 by 10-in. square-sawed oak; the size of the manway compartment is gradually being reduced to shorten the span of the plank required to cover it, and,

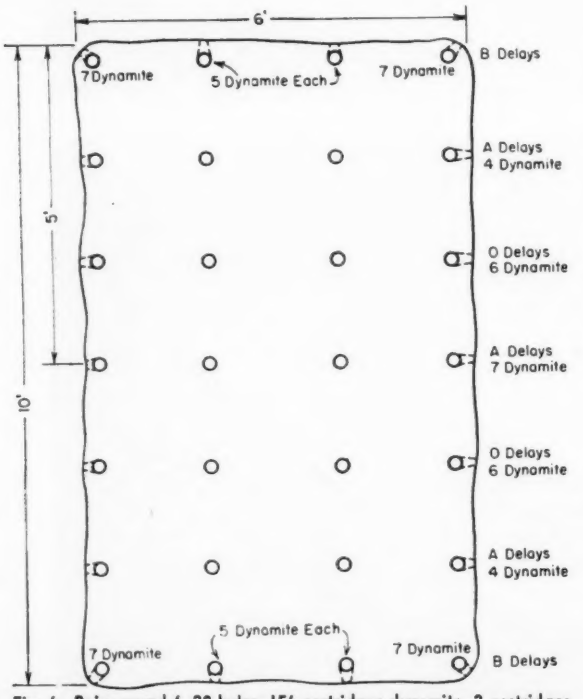


Fig. 6. Raise round 6, 28 holes, 156 cartridges dynamite, 2 cartridges sand stemming per hole

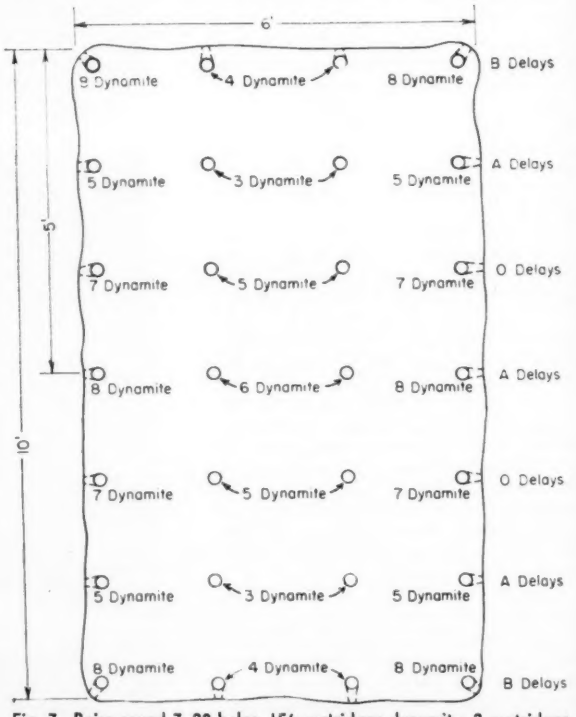


Fig. 7. Raise round 7, 28 holes, 156 cartridges dynamite, 2 cartridges sand stemming per hole

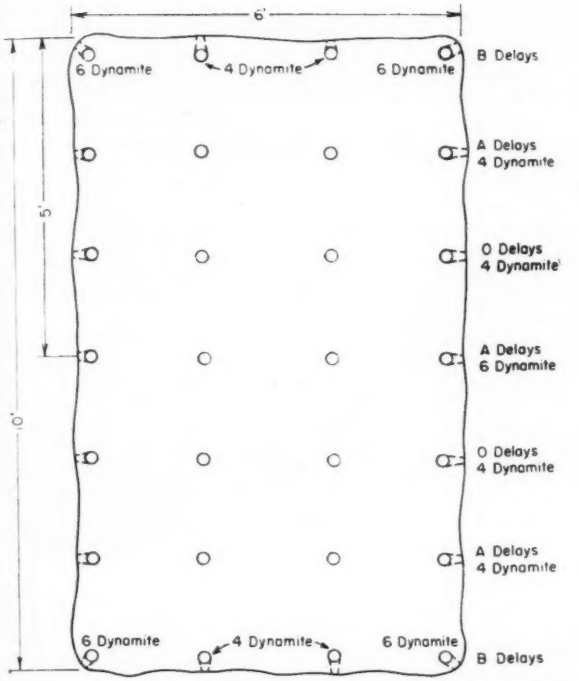


Fig. 8. Raise round 8, 28 holes, 128 cartridges dynamite, 2 cartridges sand stemming per hole

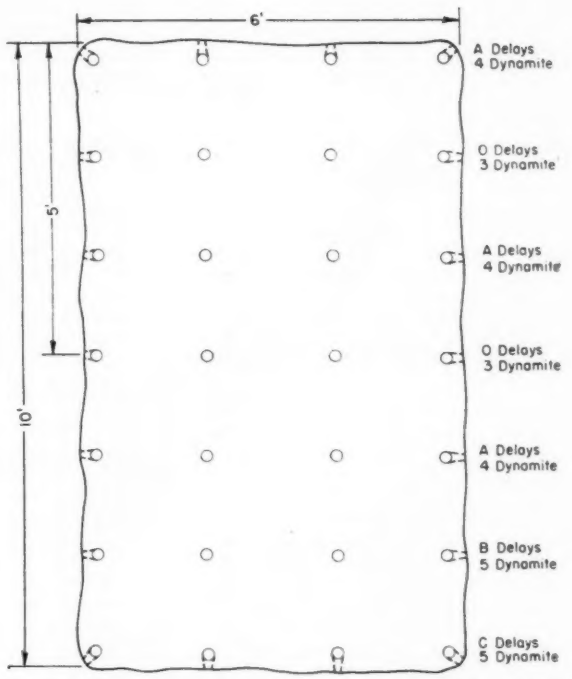


Fig. 9. Raise round 9, 28 holes, 112 cartridges dynamite, 2 cartridges sand stemming per hole

of course, at the same time the chute compartment is gradually being enlarged.

Since the change-over to larger timber only one round has been blasted, and the timbers of the top set were not damaged; but that round was blasted with a reduced charge of dynamite. All six rounds reported in this article were 28-hole, no-cut-hole rounds drilled the same as that described for round 5 and illustrated by Fig. 5 in the previous article. The only difference in the rounds was the quantity of explosive, its distribution, the pattern of the delays, and, in rounds 6 and 7, the length of the rounds, which were 6 ft instead of 5 ft. Any bootlegs were blasted before drilling the succeeding round, so that each round was drilled in a clean face. In drilling, either reground detachable bits of 1⅞- and 1¾-in. gauge or tungsten carbide insert bits of the same gauge, were used. In other words, no hole was bottomed with less than 1¾-in. diam. All rounds were loaded with the primer in the bottom of each hole. Each hole was stemmed with two cartridges of sand stemming per hole held by a wad of paper. The dynamite, in 1½ by 8-in. cartridges, was 60 percent ammonia gelatin from the same lot used in the previous five rounds. The millisecond delay caps were zero, A, B, and C in which the time interval between the zero delay and A was 28 to 30 milliseconds; between the zero delay and the B delay, 75 to 78 milliseconds; and between the zero delay and C delay, approximately 125 milliseconds.

Round 6 was drilled in chloritic greenstone associated with some epidosite. The arrangement of the delays and the distribution of the dynamite are shown in Fig. 6. There were 13 bootlegs, most of them in the side holes. The maximum depth of the bootlegs was 14 in.; the minimum, 5 in.; and the average, 8 in.

Round 7, another 6-ft round, was drilled the same as round 6 and the rock conditions for the two rounds were virtually identical. The distribution of the dynamite and the pattern of delays are shown in Fig. 7. There were four bootlegs from this round, three of them being in corner

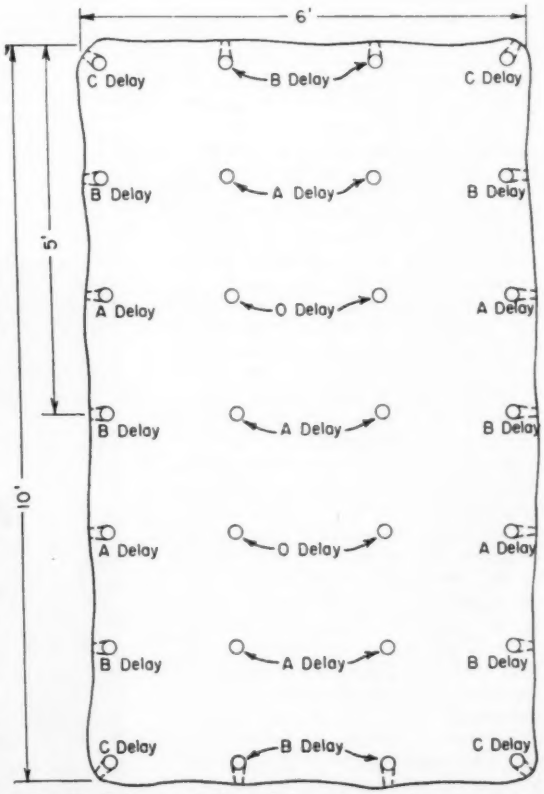


Fig. 10. Raise round 10, 28 holes, 112 cartridges dynamite, 4 cartridges dynamite and 2 cartridges sand stemming per hole

holes; the results indicate that the proper way to avoid corner-hole bootlegs is not by increasing the dynamite charge in those holes but by using a later delay. The maximum depth of the bootlegs was 12 in.; the minimum, 7 in.; and the average, 10 in.

Round 8 was a 5-ft round drilled in virtually the same kind of rock encountered in the previous two rounds. The distribution of the dynamite and the pattern of the delays are shown in Fig. 8. There were 11 bootlegs, all except one of which were in side holes or corner holes. The maximum depth of the bootlegs was 20 in.; the minimum, 5 in.; and the average, 11 in.

Round 9, another 5-ft round, was drilled in slightly different ground; the holes over the chute-compartment end cut through more epidosite, and most of them bottomed in about a foot of it. The dynamite charge for this round was reduced by 12½ percent (16 sticks). The loading and distribution of the delays are shown in Fig. 9. Nineteen bootlegs resulted from this round; they occurred in the side holes, all four corners, and in the holes over the chute compartment, which had bottomed in epidosite and were loaded with only three and four sticks of dynamite. The maximum depth of the bootlegs was 26 in.; the minimum, 5 in.; and the average, 12 in.

Round 10, another 5-ft round, was drilled in ground similar to that encountered in round 9, which encountered a hard rib containing more epidosite over the chute-compartment end. The charge of dynamite was the same as that used in round 9 (112 sticks) and was distributed equally, four sticks per hole. The novel pattern used for the millisecond delays is shown in Fig. 10. The results obtained from this round were excellent. All corners broke clean, and there were only six bootlegs, all of which were in the hard rib containing the epidosite. The maximum depth of the bootlegs was 12 in.; the minimum, 5 in.; and the average, 7 in.

Round 11, another 5-ft round, was drilled in ground that was virtually the same as that encountered in the previous two rounds, the only difference between it and round 10 being in the dynamite charge, which was cut to 98 sticks and distributed equally, 3½ sticks per hole. The distribution of the delays was identical with that shown in Fig. 10. As expected, there was not enough explosive, and this round did not half pull because there was a bootleg in every hole. The maximum depth of the bootlegs was 56 in.; the minimum, 14 in.; and the average, 37 in. There was a total of 1044 in. of bootlegs, which indicated a 38-percent break. This was further confirmed by approximately 10 tons of rock obtained from the round.

Several additional rounds, identical with round 10, will be blasted to confirm these results before further experiments are made by changing the delay pattern with closer-spaced delays. The results thus far obtained indicate that the blasting of raise rounds without cut holes and with millisecond delays was no fluke. As pointed out in the previous article, elimination of the conventional V-cut reduced the drilling required by four 5½-ft holes, and by drilling the other four holes of the V straight in their length was reduced by another half foot each. Thus, 24 ft of drilling has been eliminated and the drilling made easier, as straight-in holes are less troublesome to drill than cut holes. The elimination of four holes automatically reduces the number of caps required, and a possible reduction of the dynamite charge by perhaps as much as 10 to 15 percent makes further experimentation with this type of blasting look very attractive.

Colmol in Operation

(*Continued from page* 25)

the two crewmen team up to help on timbering and other work when necessary. This face crew is augmented by one man outside at the storage bin, two men on off-shift for general maintenance work and a crew foreman. Since production is confined to one area, the foreman can spend a majority of his time at the face, giving him opportunity for closer supervision of the crew.

The Colmol and this crew, on a day when operating conditions were ideal, produced over 400 tons in a single shift. On this particular day, buggy haulage distance was short and road conditions favorable and during this record run the Colmol drove a single 9½-ft breakthrough 80 ft in 90 minutes producing 128 tons of coal. The daily average production to date is 225 tons per shift, which means an average daily advance of approximately 112 ft in a standard 12-ft entry. This average production should steadily increase as drainage and haulage road conditions improve; water seepage along the roads has been a constant drawback to efficient shuttle car haulage, but this condition is now being corrected. It is also felt that our crew members will develop better coordination as they gain experience with this system of, comparatively speaking, rapid advance mining.

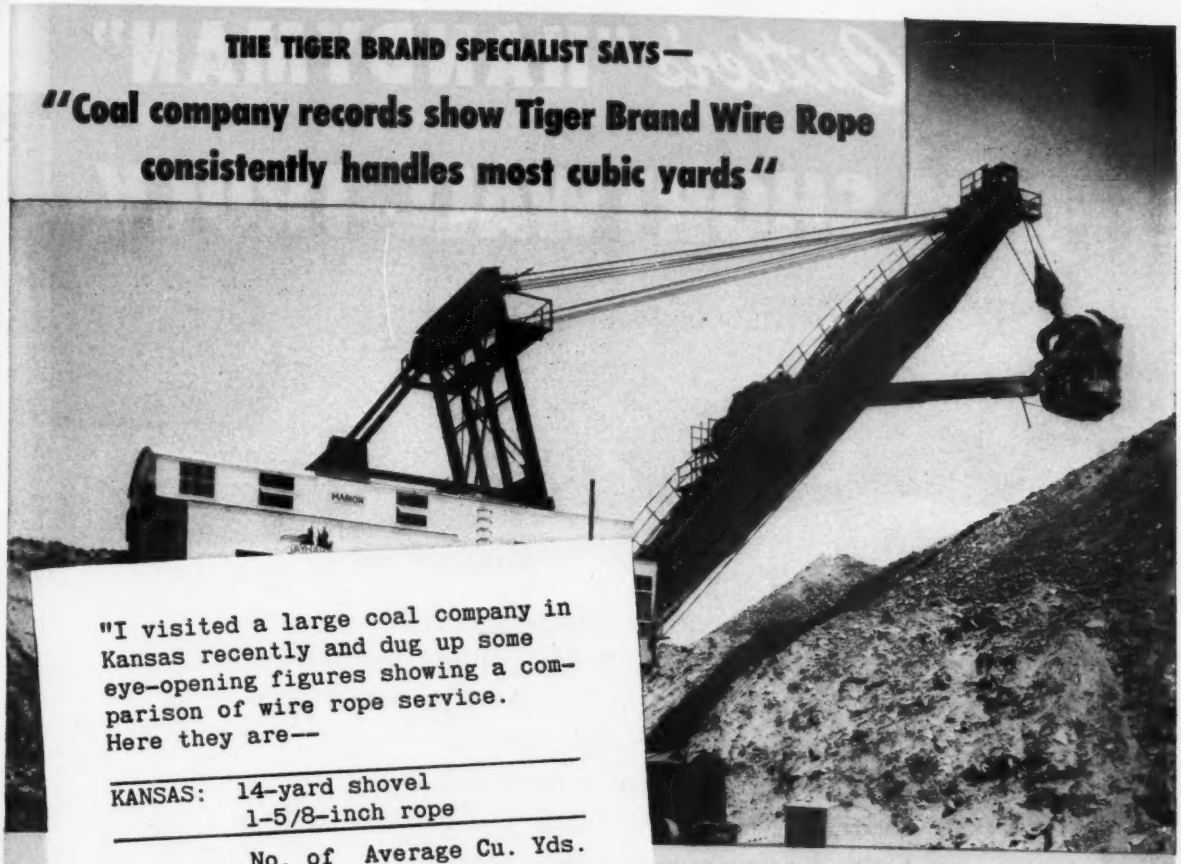
To date a minimum of down time has been experienced from any mechanical failures of the unit. However, some daily productive time is lost due to some experimental work that is being done with various type bits for the machine. At present the best cutting results have been obtained with a carbide tip bit, which turns out a more uniform size product and a smaller percentage of fines. This type bit may be quickly resharpened and retipped when necessary after being in use for several shifts. Other experimental work is being done on various suggested mining methods for the Colmol which may result in more efficient use of the machine and in greater production.



Widening entry by taking 2½-ft lift

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"Coal company records show Tiger Brand Wire Rope consistently handles most cubic yards"



"I visited a large coal company in Kansas recently and dug up some eye-opening figures showing a comparison of wire rope service. Here they are—

KANSAS: 14-yard shovel
1-5/8-inch rope

	No. of Ropes	Average Cu. Yds. handled per rope
Tiger Brand	16	529,605
Brand A	4	486,614
Brand B	12	401,722
Brand C	4	436,353
Brand D	7	432,050

"This is not just an isolated case. Time after time where direct comparisons have been made of wire rope service life, Tiger Brand stands at the top of the list."

TIGER BRAND Wire Rope Specialists are interested in seeing that you get a full dollar's worth of performance out of every dollar you invest in wire rope. Most of their time is spent right out where the rope is used.

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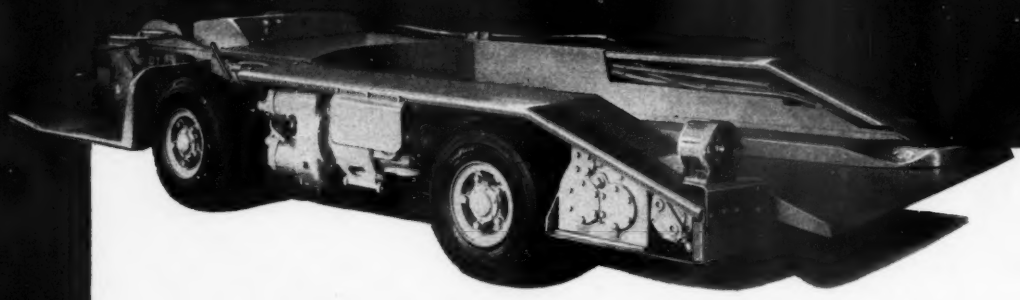
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UNITED STATES STEEL

The Coal Cutter's "HANDYMAN"

JEFFREY SHORTWALL TRUCK

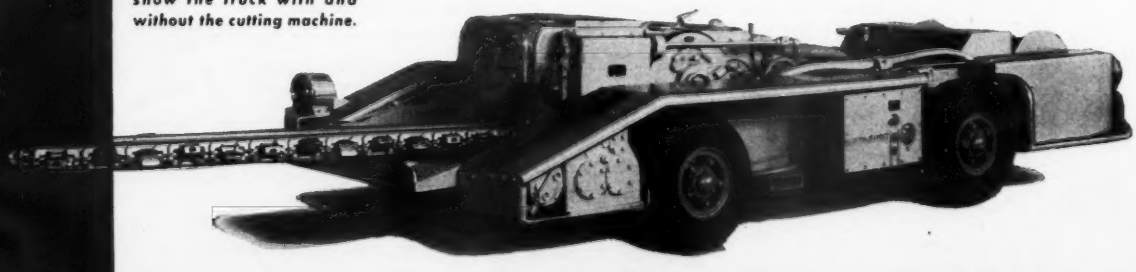


Here's a rubber-tired vehicle specifically designed for hauling SHORTWALL cutting machines in trackless mining operations. Aside from the steering this unit features full hydraulic control. Two wheel steering by steering wheel. It has a two-speed gear box with neutral and drive is by two hydraulic motors in parallel.

This truck has a tilting pan that facilitates loading and unloading the cutting machine. Machine is loaded and unloaded under its own power. Truck has a tramming speed of three miles per hour.

A truck of high utility value (can also be used for supplies) that is worthy of your consideration. Consult a Jeffrey Engineer on your cutting machine transportation problems.

The two views on this page show the truck with and without the cutting machine.



DRILLS
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View shows a SHORTWALL coal cutter being unloaded from the truck—a roof jack is set at the face to which a handling rope (shown longside of cutter bar) is anchored and machine pulled off.

To reload, rope is anchored to pin on rear of truck tilting pan and machine is pulled on. Very simple—time is saved in moving cutter from room to room and in spotting it for cutting. Send for NEW Catalog No. 823.

The Jeffrey Manufacturing Company

Established 1877

958 North Fourth Street, Columbus 16, Ohio

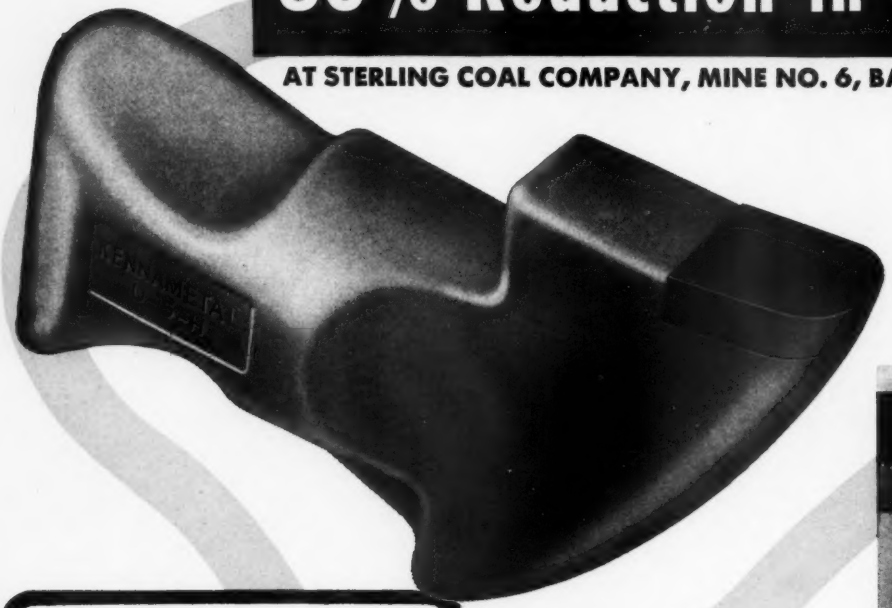
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Kennametal U-5-H's Make

86% Reduction in Bit Cost

AT STERLING COAL COMPANY, MINE NO. 6, BAKERTOWN, PA.





TOP CUTTING

A set of 42 Kennametal U-5-H Bits, on this Jeffrey 29C, cuts 1300 20' places, 8' deep in 3' coal.

Cost Reductions Made With Kennametal U-5-H Bits, as Reported by T. J. Lamont, Mine Superintendent

	Conventional	Kennametal
Tonnage/Set of 42 Bits	133	24,700
Number of Bits Needed to Cut 24,700 Tons (1300 places)	7,800	42
Bit Cost for 24,700 Tons	$347.00	$50.40
Bit Cost per Ton	$ .0140	$.0020
	Bit Cost Reduced 86%	
Bit Changes (1300 places)	186	2
	Bit Changing Reduced 98.9%	

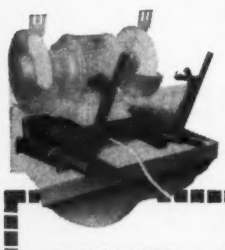


T. J. Lamont, Superintendent of the mine, says, "Kennametal Bits give us far better service—reducing bit cost per ton by 86%. A set of 42 bits cuts 24,700 tons of coal at a bit cost of .2 of one cent per ton."

Equally important, in terms of savings, is the fact that Kennametal Bits require less changing. As Mr. Lamont points out, "Bit changing has been reduced 98.9% since Kennametal Bits have been on the job."

At the Sterling mine, the life of Kennametal Bits is 186 times that of conventional bits. 500 places are cut with Kennametal Bits before resharpening—in cutting 24,700 tons, only two resharpenings were needed.

Production can be increased . . . overall operations improved by cutting in less time at less cost, with Kennametal Cemented Carbide Bits. Read the summary at the left, which is typical of the savings. Consider what this would mean in your mine. Write today for further particulars. Mining Division, Kennametal Inc., Latrobe, Pa.



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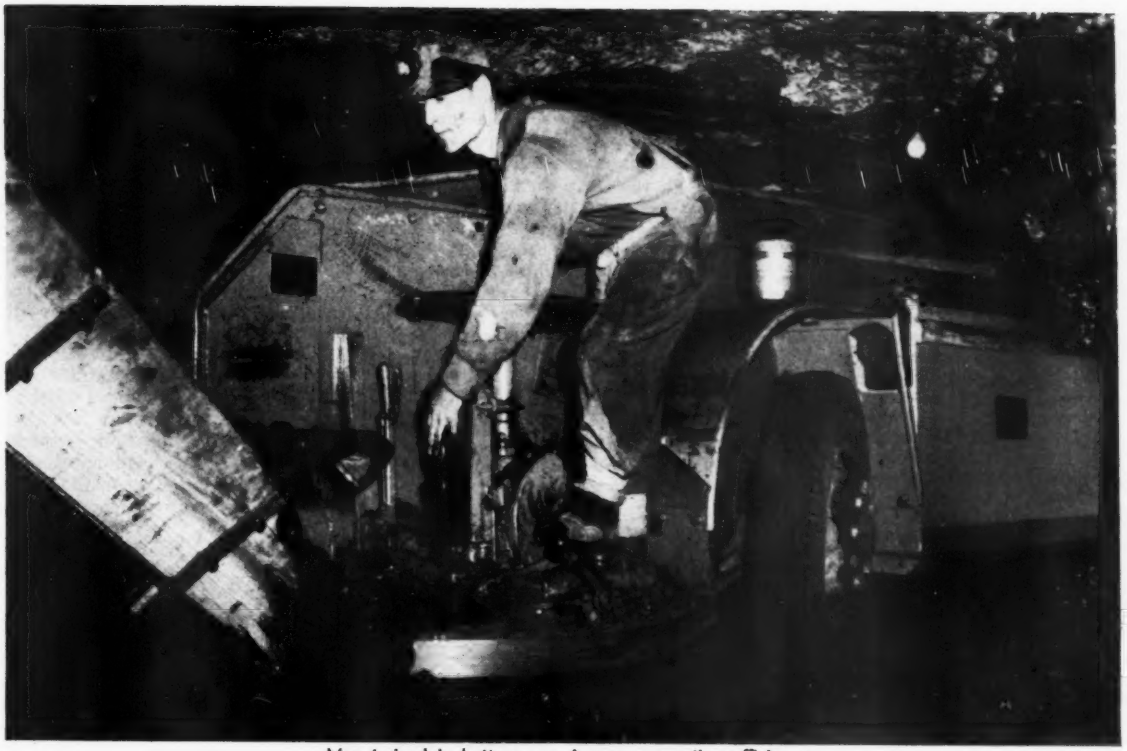
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Men trained in battery care improve operating efficiency

Handling Batteries Underground

Outlined here are the advantages and disadvantages of both centralized and decentralized charging methods, the handling techniques used in four different mines, and two interesting "ingenuities" which have been found helpful in handling batteries underground

By A. WAYNE BITNER
Research Assistant, Mining Engineering
The Pennsylvania State College

WITH the continuing rise in labor and equipment costs, mine management currently is scrutinizing production methods and costs more intently than it has in the past ten years.

Of primary importance in maintaining continuous high volume production, are mechanical loaders and haulage equipment. And when these and other mine vehicles are battery powered, the handling of batteries becomes a major consideration, both in keeping equipment in full-time operation and in obtaining maximum battery life and efficiency.

Centralized Charging Advantages

(1) Management knows condition of all batteries at any time.
(2) Large, well-ventilated, fireproof, well-equipped stations can be constructed within the provisions of the law and amortized over a long period.
(3) A man can be on battery duty all the time.
(4) It is practicable to well-train central station attendants in battery maintenance and repair.
(5) Batteries can be rotated between sections that give them hard use and sections in which the load is light.
(6) Battery changing stations are easy to move.
(7) Equipment failures can be quickly repaired or compensated for by a heavier load on the remaining equipment.

Disadvantages

(1) There is a certain amount of time lost in transporting the batteries to and from the station. However, proper coordination can eliminate this item as a disadvantage.
(2) Additional equipment in the way of tram cars must be provided. Battery tram cars present a haulage problem.
(3) Track must be maintained to a battery change station for storing trucks.
(4) Power failure in the central station retards battery sections a couple of hours in battery change schedule.

Decentralized, or Section, Charging—Advantages

(1) Batteries and charging equipment are under the supervision of the section foreman responsible for production.
(2) Shuttle-car operators become familiar with the care a battery should have.

(3) There is a minimum of time lost in handling batteries, i.e., (time when they are not available for charging or for operating.)
(4) Station can be placed close to the working face.

Disadvantages

(1) Management does not have good control over the batteries; for example, the section foreman may abuse them to obtain production.
(2) Large capital investment required in chargers, compressors, etc., for each section.
(3) Impracticable to have a man on battery duty all the time.
(4) Impracticable to train properly a battery man for each section.
(5) Cost of move up is greatly increased when charging station must be constructed according to law.
(6) Batteries usually have to be repaired under adverse conditions.

A Well-Planned Central Charging Station

One mine utilizes its central charging station to service two sections and care for 24 batteries. The station will be used for a maximum haul of 9000 ft, the present mine boundary. Tram cars, comprising old mine trucks and a few boards, are used to haul the batteries to and from the station.

There are three batteries for every shuttle car and the batteries are changed at least every five hours. The batteries are kept in pairs and remain on the tram cars from the time they leave the section until they are returned. Histories and daily reports are kept on the activities in this station. The history ledger has a record of replacement of damaged cells or cracked jars, replacement of electrolyte, painting, resealing, and any other unusual care.

Rough tile lines the central charging station. It is ventilated on a separate split through a one foot square regulator. The steel doors are attached to the regulator and normally remain open. In case of fire or emergency, the steel doors are closed. This causes the regulator to close, and cuts off room ventilation (see Fig. 1).

Three men, one for each shift, attend the station and are responsible for the ordinary care of the batteries. Their duties include keeping the sections supplied with charged batteries, recharging, cleaning, refilling and inspecting the batteries for any deviation from normal behavior. The attendants are charged with keeping records of all their activities. Management requires records of the specific gravity and temperature of each battery before and after charge; the ampere-hour setting of the charging equipment, and the hour that the battery went on and came off charge. The ampere-hour meter is set according to the specific gravity of the battery by the use of a chart supplied by the battery manufacturers. Equalizing charges are given each weekend.

A boss mechanic has charge of this and one other central charging station. He is responsible for the operation of the batteries and has instructed the attendants to remove all batteries from service that are not normal. These batteries are placed on a spur near the station where the trouble is analyzed and the boss mechanic repairs them or calls in a battery company representative.

Every station is equipped with two balancer motor-generator sets, each capable of charging four batteries. Eight individual charging controls make it possible to control the charging of each battery independent of the others.

Shuttle-car batteries are changed at stations situated near the sections.

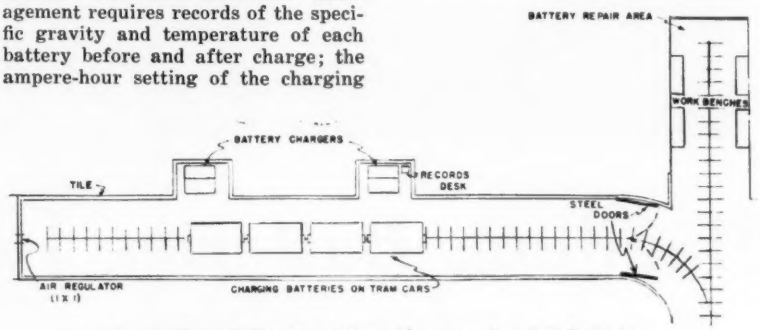


Fig. 1. Central charging station with a capacity of 16 batteries

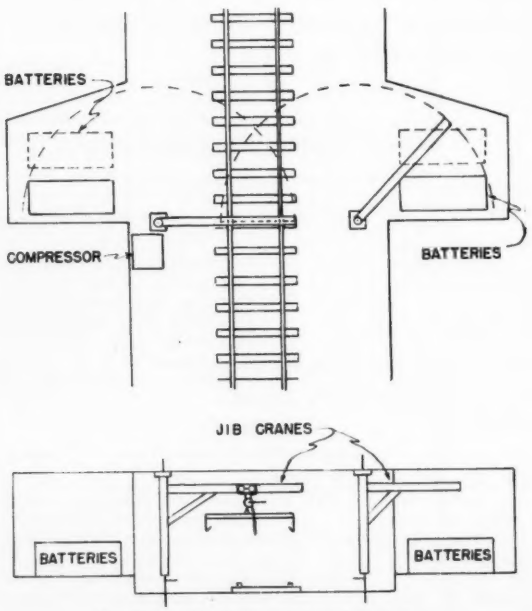


Fig. 2. Section battery changing station

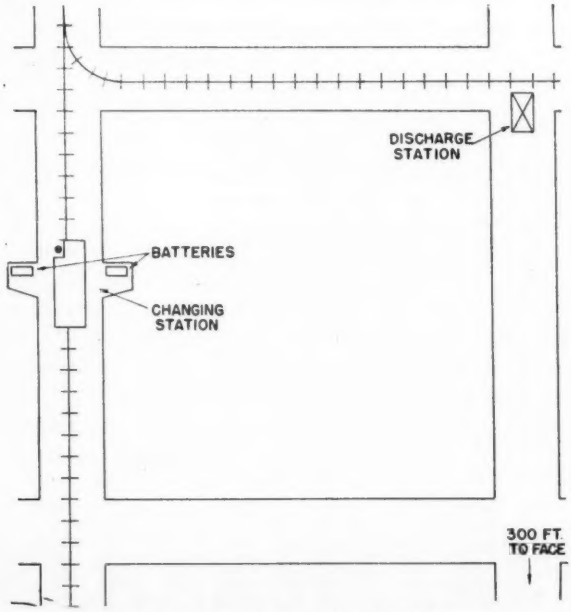


Fig. 3. Section battery changing station

They are marked with chalk and then transported to the central charging station by tram car.

Section changing stations consist of a wide portion of an entry made by taking a single cut from each side of the entry. Bottom is left in to reduce the amount of labor necessary to change the batteries. Four shuttle cars use each station.

Changing-station equipment in the section station consists of an air compressor, two jib cranes, two ratchet hoists, and two spreader bars, (to concentrate the strain of lifting at the battery-case handles.) One man can change a shuttle car battery in six minutes. Two men require one-half shift to move this installation forward.

In this mine the battery changing station is located within 100 ft. of the discharge point. The locations of both are changed every 300 ft. Mining is so planned that the same points are used in retreating as well as in advancing. Since there are three sets of batteries per shuttle car and battery changes are made well before the batteries are close to complete discharge. The change is made when one of the two loaders in the section is tramming, thus avoiding any appreciable production loss due to battery changing (see Figs. 2 and 3).

The equipment required to service six shuttle cars and twenty-four batteries in this mine is:

Battery charging equipment—charges four sets	2 at	$4,000	$8,000
Jib cranes, two per section	4 at	265	1,060
Ratchet hoists—three ton, two per section	4 at	100	400
Air compressor, one per section	2 at	100	200
Spreader bars, two per section	4 at	30	120
Total Cost			$9,780

16 flat cars—constructed in mine shop

Section Charging Fits Specific Conditions

A mine in low coal uses belt haulage. Section charging is the only feasible method under these conditions (see Fig. 4). The station is built to comply with the law pertaining to battery "houses" in gassy mines. It is located in a main heading from which butts are driven on each side and two rooms developed. The maximum distance to the section charging station is 2000 ft. This station cares for four shuttle cars and eight sets of batteries. It is one of several used in this mine but they are all modeled alike.

Records are kept of the time on charge, time off charge, specific gravity, temperature, water level, ampere-hour settings and the number of the last shuttle car using the batteries. These records are kept at the station for two weeks so that a section visitor can tell the condition of the batteries. After two weeks they are brought up to the mine office and filed for future reference. Maintenance men at this mine were sent to a battery manufacturer's school to receive proper maintenance instruction.

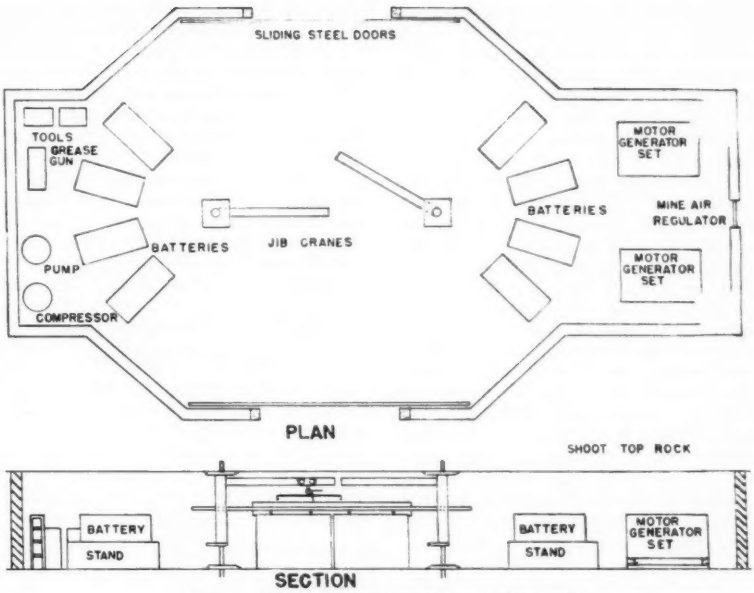


Fig. 4. A section charging station in low coal

Each section charging station is well equipped and is under the direct charge of the section electrician-mechanic who is responsible for the batteries. The station, being in low coal, has to be enlarged, and either top or bottom taken, depending upon which is easier. A regulator, on a separate split, allows proper station ventilation. This station services four shuttle cars and eight batteries. The station is equipped with two motor-generator sets each capable of handling two batteries. There is also a compressor, grease pump, and the tools necessary to repair the shuttle cars.

A special service man has the job of repairing all damaged batteries in the mine and carries his tools to the section that requires his services.

Shuttle cars operate from the face to the room neck where they climb a ramp to discharge onto a belt. When the shuttle car experiences difficulty climbing the ramp, the operator realizes his batteries need changing and that he has just enough power to reach the charging station safely.

Usually the batteries last a full shift and the operator takes his car to the charging station and leaves it at the end of the shift. The mechanic services the shuttle car and changes the batteries during the nonproductive time between shifts. His hours are staggered so that he can take advantage of these two hours for servicing.

The construction costs of this station in 1940 consisted of the following:

Two chargers at $2,000 each	$4,000
Two cranes and hoists at $250 each	500
Concrete blocks	15
Labor	180
Compressor	100
Total Cost	$4,795

A Booster Charge System

This mine is in medium coal and uses the latest development in battery shuttle cars. The shuttle cars are equipped with hydraulic controls and an adjustable elevating discharge. To provide for the extra drain on the batteries to operate these features, a provision is made to boost the batteries at the discharge station. The booster charger was specially designed for this installation with the idea that the entire setup be studied for possible future exploitation.

Under normal conditions the booster set will be started at the beginning of the shift and run continuously. For three minutes out of every eight minutes over a period of seven hours it will deliver current to a system composed of the shuttle-car batteries and motors. The current delivered will be nearly constant, varying from approximately 38 amp at 125 to 42 amp at 96 v. Based on the above duty cycle covering a seven-hour shift the

set will deliver to the system approximately 100 amp-hr of energy. This energy will be divided, part of it going into the battery as a recharge and part of it being used to supply the shuttle-car load.

The shuttle car starts out at the beginning of the shift with a fully charged battery. When the car reaches the unloading point, the booster charger will be connected to the battery terminals. At the moment of plugging into the shuttle car, there would normally be no load on the battery and the generator voltage would consequently go down to a value of approximately 120 v, which is the counter emf of the fully charged battery. At this point, the generator will be momentarily delivering 38 amp to the battery, which is in excess of the normal finishing charge rate for the battery. But because of the short period involved the charge rate is not injurious. After plugging in, the operator immediately starts up the shuttle car. The current in the battery reverses from charge to discharge and the voltage of the battery drops to 96 v. The current being supplied by the booster set will increase to approximately 42 amp and will flow into the load.

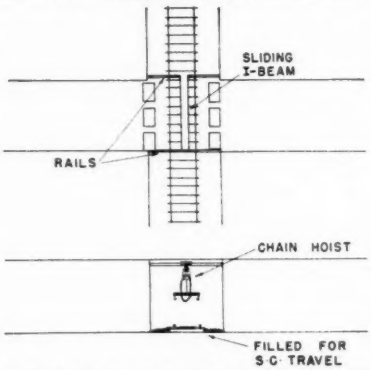
At any time during the three minutes that the booster set is plugged in, the operator may have the shuttle-car load disconnected. When this happens, the generator voltage will instantly rise back to the counter emf of the battery under charge. At the end of three minutes, the booster set is disconnected for a five-minute period while the shuttle car is away to obtain another load. The set, however, will continue to run.

As the day progresses, the battery will become progressively discharged and consequently at each cycle the counter voltage will be less than 120 v but at some value between 103 v and 120 v. The current values will be in excess of 38 amp and will correspond to the existing battery counter voltage, which can be obtained from the voltage characteristic curve. Similarly as the battery approaches discharge, its terminal voltage will go below 96 v and the generator will deliver an increased value of current according to its characteristic curve.

The outstanding feature about this installation is that the batteries last two full shifts in the shuttle car.

Battery Changing and Booster Station

The battery changing station consists of a trolley-mounted I-beam with a sliding chain hoist and spreader bar. The diagram of the discharge and booster station shows the method of connecting the booster to the shuttle car (see Fig. 5). The ramp is built to raise the elevating discharge above the mine car and the roof is taken to give it clearance. The booster charging plug is placed on the same side of the entry as the driver's seat. It is counterweighted so that it hangs free in an accessible manner. The operator grabs it as he passes up the ramp and puts it in a special receptacle on the side of the shuttle car above the steering wheel. He is instructed to put it in place before he elevates his discharge head or starts his conveyor. Thus this heavy surge is absorbed by the booster set. When the discharge is over the operator reverses his position, pulls the plug and leaves. The plug is counterweighted back into position for the repeat of this cycle when the next shuttle car arrives.



A battery changing station equipped with a chain hoist mounted on a sliding I beam

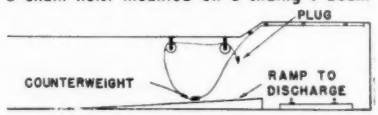


Fig. 5. Discharge and booster station

Central Charging Station

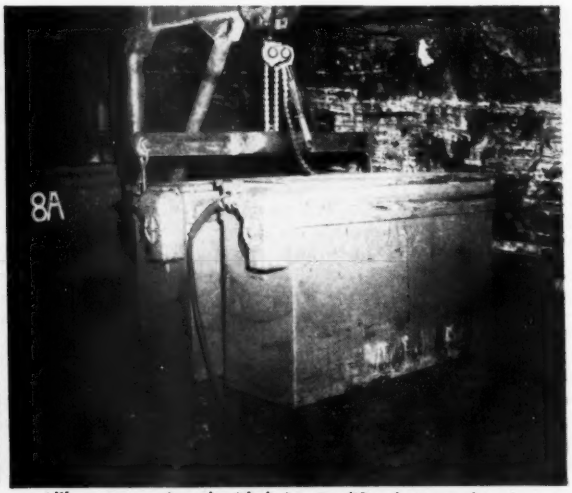
This station is of brick with steel roof and doors. It is located in one of the main headings and is ventilated by means of a regulator. A concrete platform is built at one end to act as a bumper and foundation for the charger. The charging equipment consists of a balancer motor-generator set of three-set capacity and is used to handle six sets of 400-amp-hr batteries. Since the batteries last a full day or two shifts, a mechanic on the third shift is responsible for changing, charging, and caring for the batteries. This mine, being new to battery haulage, has not yet set up a program of keeping records and providing special care for its batteries.

A section layout of this mine shows how butt entries were driven off the main heading about 1600 ft. This was done with track-mounted equipment. Rooms are worked on the right

(*Continued on page* 46)



Changing shuttle-car batteries with a roller chain hoist and spreader



Jib crane equipped with hoist simplifies battery changing

Belt Conveyors for Gathering Haulage

(*Continued from page 29*)

for the men who are dissembling and loading the pans. When 350 ft of pans have been moved, another reel of belt is put in place at the belt head, and the belt pulled by a shuttle car through the lower portion of the conveyor frame.

By the time the conveyor has been entirely moved, the belt is in place on the lower idlers. The belt is then pulled back over the top idlers and is connected near the belt head. The conveyor frame is leveled with wooden blocking, the tail section tightened, the loading stations completed, the belt aligned and operations can be resumed. Lines are set by the engineers with spads every 25 ft for the alignment of conveyor pans, and the loading ramps are built before the conveyor is moved. To move each belt requires approximately 8 shifts and 48 man-shifts. It is believed that this time can be reduced, when crews are better acquainted with the work and when additional labor-saving methods can be worked out.

Equipment Details

Each of the two belts was furnished by a different manufacturer. One belt is a five-ply, 42-oz duck with a $\frac{3}{16}$-in. top cover of natural rubber and a $\frac{1}{16}$-in. undercover of the same material. The other belt is of cotton cord construction with the same thicknesses of natural rubber in top and bottom covers as the first belt described. Width of both belts is 36 in.

Conveyor sections and drives were also purchased from different manufacturers. Both were built for heavy duty underground and both are giving good service. One of the conveyors is equipped with 4 in. diam idlers set 36 in. apart, and is equipped with sealed for life ball bearings. The other conveyor has 5 in. diam idlers set 42 in. apart and is equipped with roller bearings which must be greased once every three months. Special rubber-covered idlers of two designs are used at loading stations to cushion the shock when large boulders are discharged on the belt. Seventy-five horsepower motors are used to drive each belt through suitable reduction gears. A tandem pulley drive is used on each belt. Each is designed to convey 550 tph up or down a 15 deg slope at speeds up to 400 fpm. At present each belt is being operated in a rolling section where the average grade does not exceed 3 percent.

Much more operational data must be acquired to determine the saving in costs. Belt wear has not been appreciably noticeable after nine months of operation on two shifts. There have been some small cuts in the belts made by accidents of one kind or another, but these are easily repaired by vulcanizing. If not vulcanized the fine ore works in between the rubber and the fabric and forms a blister which gradually enlarges. Life of the belt is difficult to predict, and estimates run from three to seven years.

Before the equipment was ordered, experiments in improved fragmentation of ore by new blasting methods were made. Some improvement was made and the number of large boulders considerably reduced. It is occasionally necessary, however, to leave some large fragments at the face and break them by secondary blasting. It was found that the size of the boulders which could be handled on the conveyors depended on the belt speed and idler spacing. At belt speeds in excess of 350 fpm, large boulders caused damage to the idlers, but with a belt speed of 350 fpm or less, boulders weighing up to 400-500 lb could be handled successfully. Heavier pieces of ore will damage the idlers. It was found that closer idler spacing was advantageous in transporting lumps at higher speeds. Side loading of the belts had been found practical but the use of diverting chutes to load the material on the belt in the direction in which it is running has proven to be a more satisfactory method of loading.

Belts have proven superior to locomotive haulage where steep grades are encountered. They are of advantage where ore is less than 6 ft thick, since much handling of waste can be eliminated. Adoption of belt haulage was made to overcome these special conditions. For long hauls over relatively level tracks, belts of this size would probably not prove economical in this operation. There is the possibility of using smaller belts for main haulage if the ore is crushed before transfer to them.

Mining Heroes

By HENRY F. UNGER

IN the 43 years since the Hero Fund of the Carnegie Hero Fund Commission was set up, more than 3300 persons have been immortalized in bronze, silver, or gold medals. Their stories tell of battles with water, poison gas, fires, electricity and wild animals—all waged on behalf of the other fellow.

No one is eligible to have their deeds recorded, and win medals or cash, who must save lives in the course of regular duty. The professional, the Commission believes, incurs far less risk than the amateur.

Among miners and others connected with the mining industry, there is no dearth of amateurs when it comes to life saving in heroic style. Some of the stories of these heroes are particularly interesting.

One spring day in a Henderson, Ky., mine motorman Porter C. Gish was working on a routine haulage job when the shaft caught fire. Flame descended to the main entry and smoke filled it back to a brattice.

The miners were in five groups with the farthest about 1900 ft from the shaft and unaware of the fire. Recognizing the danger, Porter Gish ran his train to a point in the main entry just behind the brattice, where there was no smoke. Running through the mine, he warned the men and directed them to his train. Moving out the main entry he stopped at a point within 200 ft of the flaming shaft and led the men to safety through a little known passageway. Then, remembering five men he had forgotten to warn, he returned down the main entry, found the missing men, and led them to safety. For his heroic action, Porter C. Gish was awarded the Carnegie bronze medal and $1000 to be used for practical purposes.

To keep fakers from receiving awards, the Hero Fund Commission scrupulously checks every claim. Frequently, field men duplicate a given feat as nearly as possible to make sure of its risks. These field men plunge into water, are lowered into gas-filled mines, and expose themselves to every type of danger.

Heroic action by David H. Jones and Benjamin F. Major at Jerome, Ariz., saved the life of another miner. Some ten men, including Jones and Major, were igniting fuses when one charge exploded prematurely, trapping one man under a boulder.

Realizing the danger of following blasts to themselves and to the trapped miner, Jones and Major frantically began to pull the ignited fuses from the hole. There were 35 fuses within a radius of 30 ft of the trapped man. The men were unable to extract all of the fuses but enough were drawn so that the remaining charges did not kill the trio. Each of the miners received the renowned bronze medal and $1000.

These are just a few examples of the thousands of instances in which mining men have gone to the aid of others without thought of personal danger. Space limitations prevent the listing of more of these heroic incidents, but those who have a desire to learn more of the heroic actions that have been taken by many miners are urged to read the records of the Carnegie Hero Fund Commission.

Coal Mine Power Costs

The Trend Toward Complete Mechanization of Underground Coal Mining Operations and the Growing Use of Mechanical Cleaning Is Reflected by Greater Power Consumption

A CROSS-SECTION of the power used in coal mining in the southern Appalachian field is furnished through a survey made by the West Virginia Engineering Company, covering a group of 178 mines operating in West Virginia, Virgina and Kentucky, which produced 56,500,000 tons in 1948. The data is compiled in an Analysis of Power Costs of Coal Mines*, which tabulates a total of 23 different items on general mining conditions, including tonnage methods of loading, haulage and seam thickness and specific power data such as substation capacity, demand, primary charges, connected load, consumption and costs. The following discussion on the trends as indicated is given by H. P. Musser, president, West Virginia Engineering Co.:

"As might be expected, the cost of electricity for mining coal increased during 1948, along with almost everything else. Prices of coal were high, and this in turn caused higher coal clause surcharges to be made by the central station companies. The analysis shows few indications of more efficient operation, taking the group as a whole.

"Studies show that both energy use (kwhr) and kilowatt demands increased in 1948. The increase of kilowatt demands without appreciable tonnage change can be attributed largely to the addition of non-coal-producing loads, particularly cleaning plants. More fully loading the substations as shown by the increase in d-c horsepower per kw of substation capacity also accounts for some increase in demands.

"Load factor based on demand decreased in all classes except one. It is evident that the demands increased more rapidly than the kilowatt-hour consumption, and such an increase in demands can be partially attributed to the addition of many cleaning plants in 1948. The trend toward installation of large capacity cleaning plants will likely be a factor for several years in increasing the non-coal-producing load at the mines. Load factor based on connected horsepower is lower in all classes except two, indicating that the equipment available was used for fewer hours in mining operations.

"The kilowatt-hours required to mine a ton of coal increased in all six classes, indicating the continued trend toward increased mechanization. The percentages of coal loaded mechanically in each tonnage class, from the smallest mines to the largest are: 43 percent, 50 percent, 69 percent, 70 percent, 58 percent and 65 percent. It is interesting to note that the largest percentages of mechanical loading are found in the 10,000 to 20,000 ton class, and the 20,000 to 30,000 ton class. As all forms of hand work become less and machinery is substituted, there will be a constantly increasing use of electricity.

"The analysis shows the cost per kilowatt-hours increased in five of the six classes. This increase can be attributed directly to the coal clauses in the power tariffs. The total cost of power increased in all six classes. The full effect of postwar inflation shows in the pronounced increase in kilowatt-hour costs. Normally the long range cost of electricity is to lower levels, but in 1948 there was an intermediate or short term increase in cost. The factors causing this are: increased demands, lower load fac-

Table I

POWER COSTS OF COAL MINES—AVERAGES FOR TEN YEARS 1939-1948

Year	Number of Mines	Average Monthly Tonnage	Substation Capacity kw	Average Monthly kwhr Purchased	Total Cost per kwhr (Cents)	Kwhr Per Ton Coal	Power Cost per Ton Coal (Cents)
MONTHLY TONNAGE CLASS—10,000 TO 20,000 TONS							
1939	48	13,760	348	80,880	1.68	5.88	9.87
1940	41	14,433	325	79,136	1.71	5.48	9.37
1941	50	14,955	309	79,331	1.56	5.30	8.30
1942	44	15,374	327	94,307	1.54	6.13	9.42
1943	48	15,067	334	88,799	1.57	5.89	9.23
1944	44	14,432	345	89,743	1.58	6.22	9.83
1945	43	14,443	370	85,923	1.68	5.97	9.49
1946	55	14,600	397	94,618	1.50	6.48	9.74
1947	48	14,568	393	99,781	1.53	6.85	10.49
1948	51	14,915	457	112,471	1.60	7.54	12.03
MONTHLY TONNAGE CLASS—20,000 TO 30,000 TONS							
1939	28	24,565	480	134,134	1.46	5.46	7.99
1940	33	24,946	475	140,145	1.46	5.62	8.19
1941	27	24,945	494	144,863	1.41	5.81	8.19
1942	35	23,915	448	132,718	1.48	5.55	8.22
1943	32	24,465	461	144,159	1.43	5.89	8.43
1944	35	24,578	467	146,831	1.46	5.97	8.64
1945	36	24,585	517	153,055	1.51	6.31	9.14
1946	34	24,838	603	164,187	1.44	6.61	9.51
1947	35	24,649	526	148,860	1.44	6.03	8.71
1948	29	25,035	634	171,094	1.53	6.83	10.44
MONTHLY TONNAGE CLASS—30,000 TO 60,000 TONS							
1939	26	40,231	769	210,402	1.41	5.23	7.39
1940	26	42,340	732	234,603	1.37	5.54	7.60
1941	27	42,130	736	232,853	1.34	5.53	7.38
1942	39	41,151	718	233,560	1.35	5.68	7.65
1943	30	38,373	685	226,363	1.40	5.90	8.23
1944	33	38,035	643	217,218	1.39	5.71	7.94
1945	26	38,774	796	255,587	1.42	6.57	9.34
1946	20	41,824	928	280,711	1.35	6.71	9.03
1947	34	40,129	840	273,174	1.37	6.80	9.35
1948	28	37,632	869	273,095	1.46	7.25	10.57
MONTHLY TONNAGE CLASS—OVER 60,000 TONS							
1939	5	86,825	1070	541,730	1.10	6.24	6.87
1940	12	90,090	1417	512,358	1.17	5.69	6.63
1941	11	86,017	1412	592,332	1.11	6.89	7.65
1942	11	74,649	1171	459,215	1.19	6.15	7.30
1943	14	80,440	1250	485,859	1.21	6.04	7.30
1944	15	84,557	1420	515,405	1.21	6.10	7.37
1945	15	80,935	1593	543,479	1.22	6.87	8.25
1946	14	80,408	1786	557,572	1.15	6.93	7.96
1947	17	99,971	1856	644,103	1.17	6.44	7.52
1948	19	91,210	2134	684,028	1.24	7.50	9.27

* Copies are available on request to the American Mining Congress.

tors, and especially the coal clauses.

"The direct result of increased kilowatt-hours per ton and increased cost per kilowatt-hours is naturally an increase in cost per ton. The mines producing small tonnages paid an average of 18.39¢ per ton, while the mines producing large tonnages paid an average of 9.27¢ per ton. These two figures in 1947 were 15.48¢ and 7.52¢."

Increasing Mechanization

The foregoing applies to the entire group of 178 mines covered by the survey but in common with the coal industry throughout the United States, the majority of the tonnage of this group is produced by the larger operations. The remainder of this article, as well as the tables presented, deal only with those mines that produced more than 10,000 tons per month. These are 127 in number and mined 51,300,000 tons during the year which was slightly more than 90 percent of the tonnage mined by the entire group. The practices at these larger operations may correctly be considered as being representative of the practices used at the larger and more modern mines throughout the United States, and the survey, in addition to being of special interest to electrical engineers, also has many points of general interest to all operating men.

Table I which is a compilation of the averages for the various items shown over the past ten years, indicates the general trends in power use as pointed out and explained by Mr. Musser, namely, an increase in substation capacity, in the amount of power used and in power costs. He also referred to the trend from hand loading to mechanical loading and a further breakdown of the figures show this in more detail.

Considering only the post-war period—from 1945 to date—Table II divides the total number of mines into three classifications: (1) "All Mechanical Loading" which includes the mines that loaded more than 90 percent of their tonnage with machines; (2) "Mechanical and Hand Loading" which include those mines that loaded any tonnage mechanically, up to 90 percent of their total output; (3) "All Hand Loading" which includes those mines which had no mechanical loading. These same classifications apply to Tables II, III and IV.

The figures in these tables are self-explanatory. Table II shows both by the number of mines and by the percentage figures, the decided drift from hand loading into mechanical operation, and it is of special interest to note, in the fourth and last columns of this table, that for the year 1948 only ten of these mines, or 8 percent of the total, were using only hand loading. This same trend is indicated by the tonnage figures in Table III where again the trend from hand to mechanical methods is indicated by the fact that in 1948 only 2,800,000 tons of coal were produced by the mines with all hand loading. Although not given in the table, this tonnage is less than 6 percent of the total tonnage produced by the group of 127 mines; the last column shows that 36 percent of the total production was loaded by hand during the year.

A rather interesting fact is brought out in Table IV. Although it is true as previously mentioned in this article, that power costs are increasing, it is further true that the power costs in the mines that operated entirely with mechanical loading are less than the costs in those that use all hand loading. As pointed out in the discussions of surveys in previous years, this situation is undoubtedly due to the fact that the mechanized mines have installed modern power equipment and are following best power practices in their operation, with resultant economies and cost savings.

TABLE II—NUMBER OF MINES OPERATING BY MECHANICAL AND HAND LOADING

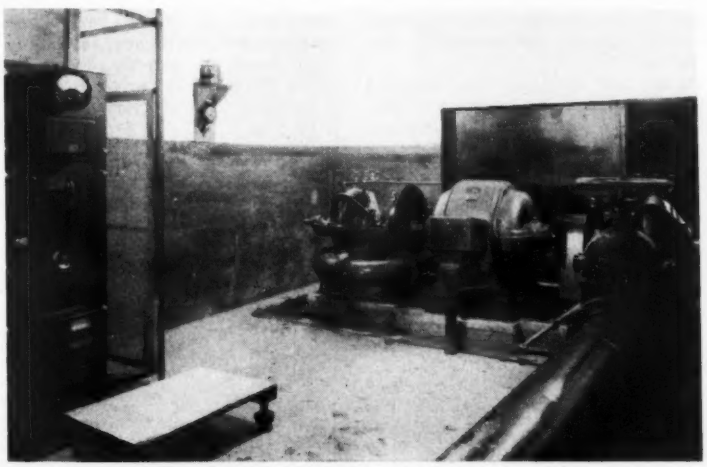
Year	All Mechanical Loading	Mechanical and Hand Loading	All Hand Loading	Total No. Mines	Percentage of Total: All Mechanical Loading	Percentage of Total: Mechanical and Hand Loading	Percentage of Total: All Hand Loading
1945	35	60	25	120	29%	50%	21%
1946	47	59	17	123	38%	48%	14%
1947	55	62	17	134	41%	46%	13%
1948	55	62	10	127	43%	49%	8%

TABLE III—TONNAGE MINED BY MECHANICAL AND HAND LOADING

Year	Method of Loading: All Mechanical	Combination Mechanical	Loading Hand	All Hand	Total Mechanical Loading	Total Hand Loading	Total Tonnage	Percentage of Total: Mechanical Loading	Percentage of Total: Hand Loading
1945	11,700,000	11,000,000	14,600,000	6,500,000	22,700,000	21,100,000	43,800,000	52%	48%
1946	15,800,000	10,100,000	13,450,000	3,950,000	25,900,000	17,400,000	43,300,000	60%	40%
1947	19,400,000	15,400,000	16,000,000	4,700,000	34,800,000	20,700,000	55,500,000	63%	37%
1948	17,700,000	15,100,000	15,700,000	2,800,000	32,800,000	18,500,000	51,300,000	64%	36%

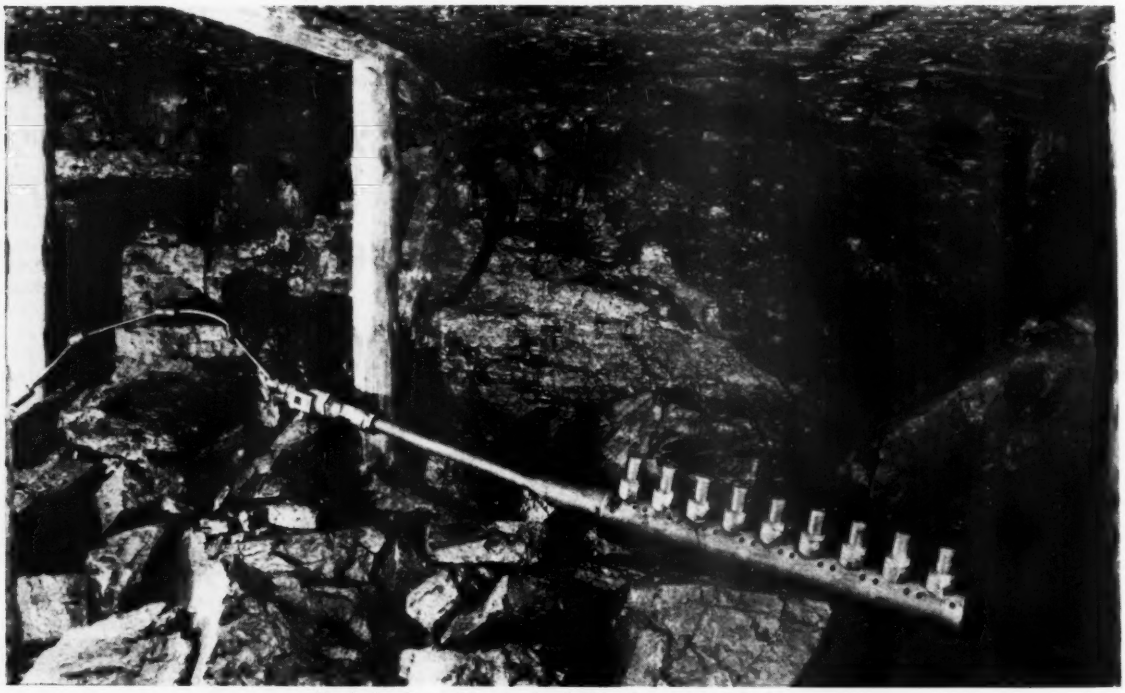
TABLE IV—KWHR PER TON IN HAND AND MECHANICAL LOADING

	Mechanical Loading	Hand Loading
1945	6.14	6.46
1946	5.95	7.05
1947	6.00	6.70
1948	6.63	6.92



Modern electrical installations reduce operating costs

Machinery For Britain's Mines



The hydraulic coal burster has broken down a cut 5 ft deep

Exhibits Emphasize the Attention Being Given by the British Mining Industry Toward Developing Labor-Saving Machinery for the Workers Underground

By A. F. RADCLIFFE
Editor, *Mine and Quarry Engineering*
London

MUCH of the machinery exhibited at the Underground Mining Machinery Exhibition in London in July was new in design and of improved efficiency. Since the field was restricted to underground machinery, manufacturers were, in general, able to show a complete range of those products which come within its scope. It would be impossible to mention all the interesting exhibits; these notes are, therefore, restricted to those which are new, or of which a special feature was made by the exhibitors.

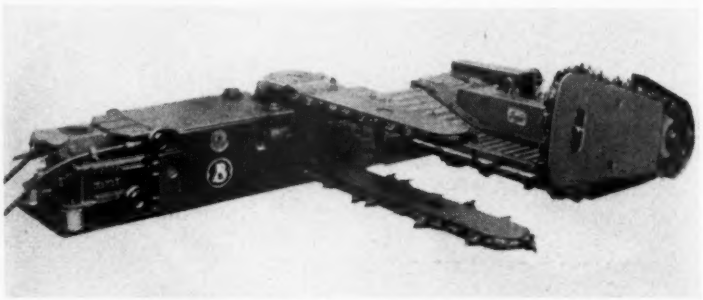
As one might expect, coal cutters took a prominent place in the exhibition and the range shown was comprehensive. Several makers were showing turret machines which permit the head to be raised or lowered hydraulically while cutting to follow an uneven roof.

Simultaneous Cutting and Loading

One of the outstanding exhibits was the A. B. Meco-Moore cutter-loader, displayed jointly by Anderson Boyes Ltd., and the Mining Engineering Co., Ltd. This is designed for simultaneous cutting and loading on long-wall faces in both directions. At the end of the run, the cutting portion can be transferred to the other side of the loading portion for the return journey. Another machine for a similar duty is the Gloster cutter, designed by Joy-Sullivan Ltd.; this is a prototype machine not previously seen in Britain.

Mavor and Coulson Ltd., made a special feature of their system of controlled water spray for wet cutting.

An interesting exhibit of the same company was the new 15-in. Samson overcutter, of which two arrangements were shown; one, for holing on floor level, is exactly 15 in. high while the other is varied in height by a hydraulic turret from 2 ft 6 in. to 3 ft 2 in.



A machine which cuts and loads simultaneously

Like our domestic manufacturers, those of Britain cooperate to show new developments to coal producers. Described here are some of the newly-designed pieces of coal mining equipment that were displayed at the recent Underground Mining Machinery Exhibition in London.

Conveyors and Accessories Reduce Hand Labor

The importance of conveyors was stressed as a means of reducing hand labor to a minimum. Not only were all types on view, but many new accessories were featured. Richard Sutcliffe Ltd., and Mavor and Coulson Ltd. both showed driving heads which had not previously been exhibited, the former company making a feature of the "Monarch" for duties up to 200 hp, and the "Goliath 80" for duties up to 80 hp. These are for belt speeds ranging up to 450 and 435 fpm respectively.

Mavor and Coulson also showed two arrangements of the Samson loader. One is for delivering to conveyors and measures only 24 in. in height to the deck of the conveyor; the other has modified crawlers and a jib 3 ft longer to load mine cars and deliver at any height from 3 ft to 6 ft above floor level.

New Principle in Power-loading

Another striking exhibit was the telescopic conveyor-loader for mechanized room and pillar mining and heading development work. Designed by British Jeffrey-Diamond Ltd., it applies an entirely new principle in power-loading operation and is particularly suitable for thin seams. It loads coal across the full width of the face, a telescopic gathering head being capable of extension to a maximum distance of 12 ft in search of loose coal.

A self-cleaning tail-end for belt conveyors, also displayed by British Jeffrey-Diamond Ltd., has received a great deal of attention. In it, spillage on the lower belts is diverted by blades in double helical form to the sides, where it is caught in little buckets and delivered to the top of the belt.

Locomotives in Operation

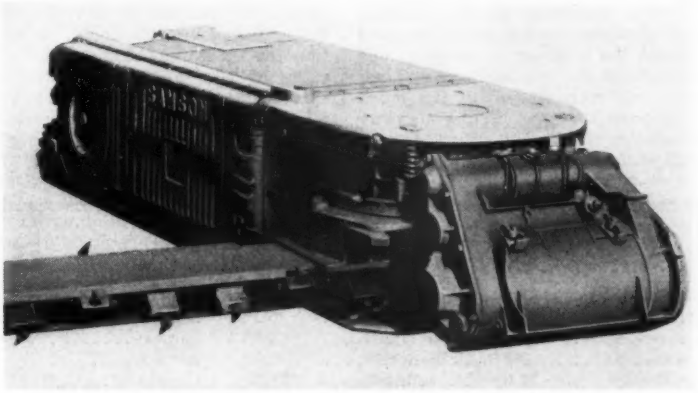
The principal makers showed a wide range of locomotives of varying types for all duties. The exhibits of North British Locomotive Co. Ltd., and of Hudswell Clarke and Company Ltd., were particularly impressive since tracks about 200 ft in length had been installed to demonstrate their machines in running conditions. Both companies are concentrating on their 100-hp Diesel locomotives. Hunslet Engine Co., Ltd., showed four types of Diesel locomotives in current production. These varied from 24 to 100 hp, and only one, the hp machine, had actually been exhibited before.

Electric locomotives were represented by the trolley machine or Distington Engineering Co. Ltd., equipped with two 30-hp slow-speed motors and by the seven-ton battery machine of William Neill and Son (St. Helens) Ltd., which is equipped with two motors of 17 hp, one driving each axle.

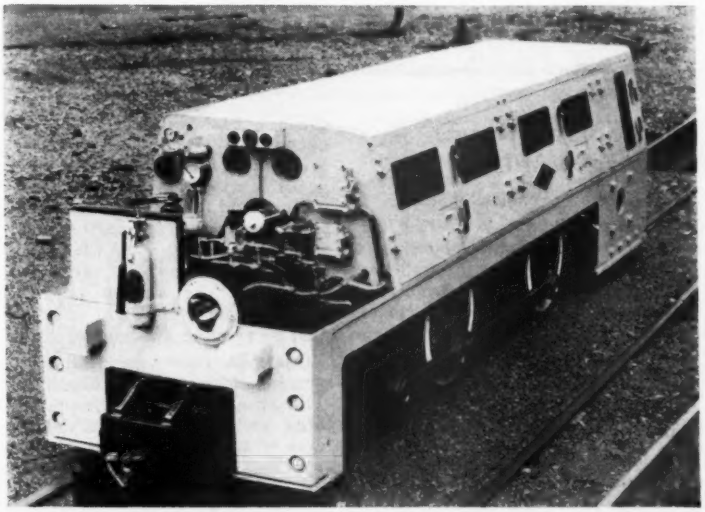
Drilling Equipment Display Includes Hydraulic Bursters

Among drills, as befits an exhibition primarily devoted to coal-getting, particular prominence was given to rotary drills, both compressed-air and electrically operated. At the same time, percussive drills were not overlooked. Several exhibits were concerned with dust-allaying attachments. An interesting alloy-tipped bit is the split-shank bit of Gullick Ltd., in which the tool is split into two parts, either of which can be changed in case of damage and matched with the undamaged side.

Gullick Ltd. were also making a feature of the hydraulic bursters for insertion into drill-holes. These bursters consist of a steel bar chambered at intervals to accommodate telescopic plungers which, under hydraulic pressure are forced out to break down coal.



A Longwall coal cutter fitted with a system of controlled water sprays



This 100-hp Diesel mine locomotive will haul 405 tons at 3 mph on a level grade

Bunker Hill Auxiliary Inclined Shaft

(*Continued from page* 23)

opened the air cylinder valve, which raised the extended boom and bucket close to the back of the shaft. The mucker was rung down, and as the lip of the bucket touched the muck the operator closed the air cylinder valve and opened the air motor valve to close the bucket. As the hoistman felt the pull of the bucket, he let the mucker down slowly. As the mucker moved down, the bulldozer blade on the truck pushed the muck ahead of it, and at the same time the bucket brought up its load and closed against the blade. The air hose was disconnected, the operator stepped off, and the loaded mucker was sent to the dump. At the dump, an air connection was made, the air motor was reversed, and the mucker dumped its load, and was sent back to the bottom in the open position. It was not necessary to use the air cylinder to dump the bucket.

In operating the mucking machines, one man stationed at the mucker dump, dumped the buckets; one man operated the muckers in loading; one man handled the 1-in. air hose and bell ropes; one man stayed on the muck pile to push the muck in the manway side over in front of the muckers.

The number of buckets to muck out a 6-ft round varied between 130 and 220 buckets, depending on the amount of overbreak and the coarseness of the muck. Only one or two buckets were hand-mucked. The muckers averaged over 1/3 cu yd per load and mucked a 6-ft round out in six to eight hours. With a mucker loading and dumping in two minutes, the two muckers mucked at a rate of 10 cu yd per hour. This is more than triple the hand mucking rate shown on other recent shaft sinking jobs.

Although it was designed especially for mucking the 50 deg inclined Auxiliary Shaft, the Bunker Hill shaft mucker, with minor modifications, will muck an inclined shaft of any degree.

It was necessary for efficient operation to keep the distance from the bottom of the shaft to the point where the muckers dumped within a reasonable distance, considering the maximum rope speed of the hoist and the time it would take to cut a dump station. The first dump station was at the 23½ level and from this station, 550 ft of inclined shaft was sunk. The second dump station was cut at the 25½ level, and the shaft was sunk to the bottom using this dump. In operation the muck was dropped down the raise by the muckers. It was then slushed through the drift and into the pocket over the shaft. The muck was hoisted out of the shaft during the drilling period.

Performance Data

The average daily and monthly rates of sinking are records for the Coeur d'Alene Mining District. In the month of May 1949, another record was set when the shaft was sunk a distance of 207 ft, which is at an average daily rate of 6.7 ft per day.

TABLE I. PERFORMANCE DATA.

Amount of shaft sunk	1100 ft
Time worked in shaft	193 days
Average progress per 24-hour day	5.7 ft
Average progress per month	171 ft
Advance per manshift (shaftmen)	0.47 ft
Advance per manshift (entire crew)	0.30 ft

Costs

During the sinking of the shaft, the following wage rates were in effect:

Shaft Boss	$13.42
Shaftman	12.65
Hoistman	12.70
Mechanic	12.40
Mechanic, Helper	11.40
Skip Tender	11.90

Wage differentials of 32¢ and 64¢ were paid respectively for afternoon shift and graveyard shift.

The shaft was sunk on a contract basis at a straight rate of $76.00 per ft but, due to overtime payments, the actual rate was higher, depending in any two-week contract period on the amount of overtime and the footage sunk. The shaft boss, three hoistmen, and two mechanics participated in the contract with the 12 shaftmen. After the wages of the 18 men on the contract had been subtracted from the total payment for footage sunk, the remainder or bonus was divided into 15 shares, each of the 12 shaftmen received a full share, and the shaft boss, the three hoistmen, and the two mechanics each received a half share.

TABLE II. DIRECT SINKING COSTS PER FT.

Labor		*Supplies*		*Miscellaneous*	
Shaft Boss	$5.04	Explosives	$4.74	Tool Repairs	$0.40
Shaftmen	62.09	Timber	9.16	Misc. Repairs	1.81
Hoistmen	13.37	Bits	5.57	Survey	4.89
Mechanic	5.07	Drill Steel	3.52	Air	3.04
Skip Tender	11.01	Miscellaneous	18.09	Overhead	15.33
Machine Shop	4.83				
TOTAL: Labor	$101.41	Supplies	$41.08	Miscellaneous	$25.47
GRAND TOTAL COST PER FT.					$167.96

Handling Batteries Underground

(*Continued from page* 40)

side coming back. The booster set and changing station are placed 350 ft from the discharge station and are kept there until the discharge station is ready to be moved behind them. The discharge station is moved every 100 ft, leaving 160 ft on the butt entry into the mined area for empty mine cars.

Unusual Charging Devices

Four batteries for two shuttle cars can be charged at one unusual station. Two sets can be charged at one time. They are charged from a d-c line through two resistance panels. The batteries are kept on turntables. It is easy to rotate them so that an empty space is available for the discharged battery and to then rotate them again to place the charged battery near the shuttle car (see Fig. 6). The mechanic in the section cares for the batteries. The station is advanced 1000 ft about every eight weeks. Four men move it in two shifts.

One mine uses a car that was constructed with a hydraulic lift and cylinder so the car bed could be rotated and the battery lifted to the level of the shuttle car. This facilitates battery changing if a single sliding hoist on a stationary I-beam is used. By use of this car, charging station construction is simplified.

Publication of this article was made possible through the courtesy of the Gould Storage Battery Corp.

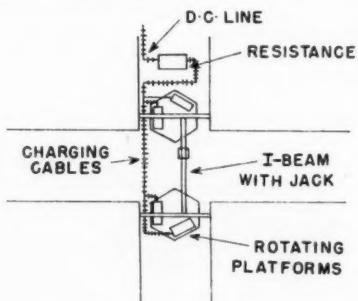


Fig. 6. Section charging station uses turntables



As Viewed by A. W. DICKINSON of the American Mining Congress

ADJOURNMENT of the gruelling first session of the 81st Congress now appears to be a matter of hours and many of the controversial measures will of necessity remain in their current status until the second session convenes in January, 1950. Although House Speaker Rayburn has given top priority for a general revision of the revenue laws next year, such a proposal will face baffling problems. The fiscal 1950 deficit has been forecast by Senator Byrd of Virginia at $6,000,000,000 and it may easily be more. During the remainder of this year the staff of the Congressional Joint Committee on Internal Revenue Taxation and the Treasury, together with the President's Council of Economic Advisors will study the question of tax revision. In spite of much talk of reducing and eliminating many of the excise taxes, the prospective deficit calls for revenue sources to replace levies now collected through excise taxes. There are proposals to increase levies on estates and gifts, life insurance companies, and to raise the corporate tax rate possibly five percentage points above the present 38 percent. There are many who firmly believe that the real answer for 1950 is to make drastic cuts in governmental spending and let the present tax structure, excise taxes, et al, strictly alone.

Incentive Payments

Now pending before the House Committee on Rules, the O'Mahoney Mine Incentive Payments bill, S. 2105 (discussed in the September JOURNAL), previously passed the Senate on October 6 by a voice vote. Senate floor amendments set a limit of $80,000,000 annually on appropriations authorizations and required repayment of funds, advanced to assist in explorations, out of profits accruing from any resultant production.

In its consideration of the Senate bill, the House Committee on Public Lands deleted the Senate provision for repayment and amplified the definition of "small base metal mines" to include mercury, manganese and chromite production.

A determined effort was made in the House to provide that aid for exploration should not constitute gross income of the producer for purposes of the Internal Revenue Code, but thus far this important protective clause is not in the bill.

Advocates of S. 2105 brought the bill up on the House consent calendar October 17, under a procedure bypassing the Rules Committee and requiring a two-thirds vote. The bill failed of passage by a vote of 176 to 118 and a number of Rules Committee members charged that there had been a breach of an agreement to delay action on the measure until next year. However, S. 2105 will retain its current legislative status when Congress reconvenes in January.

Trade Agreements

Approved by the President September 26, the bill extending the Reciprocal Trade Agreements Act of 1934 had passed the Senate on September 15 by a vote of 62 to 19. The Act is now extended to June 12, 1951, and permits the President to cut U. S. tariffs by as much as 50 percent below levels of January 1, 1945, in negotiation of trade agreements with foreign nations.

Senator Millikin of Colorado made a determined effort to retain the provision made by the 80th Congress under which "peril points" could be set by the U. S. Tariff Commission to guard against reductions of duty rates which would result in damage to U. S. industry. Millikin's amendment was rejected by a vote of 43 to 38. An amendment to limit imports of foreign petroleum to five percent of domestic needs was lost by the close vote of 41 to 40.

Following up quickly the enactment of the trade agreements authority extension, the State Department announced a new series of trade agreements negotiated at Annecy, France, this past spring, with Italy, Sweden, Denmark, Finland, Greece, Uraguay, Nicaragua, Haiti, the Dominican Republic, and Liberia. These concessions apply to agricultural commodities, chemicals, oils, earthern and glassware, wood and wood products and numerous iron and steel products. Among the mineral products are talc, steatite and french chalk, reduced from 1¢ a lb to ½¢ a lb; ferrochrome or ferrochromium containing less than three percent carbon reduced from 25 percent to 12½ percent.

Further trade agreements are in the offing.

Metals Tariffs

There now appears little likelihood that the 2¢ copper import tax will be reimposed in the present session. It is attached to a bill which would reenact the suspension of import duties on ferrous and nonferrous scrap, which lapsed on June 30 of this year. This bill has not met with favor from Senate leaders and the hour is late.

Another measure which would have permitted duty-free reentry into the U. S. of zinc metal, smelted in any foreign country from zinc concentrates

Washington Highlights

CONGRESS: Adjourning.

INCENTIVE PAYMENTS: Before House Rules Committee.

TRADE AGREEMENTS: Authority again extended.

METALS TARIFFS: No action on copper and scrap.

WAGE-HOUR: Senate-House conferees meeting.

SOCIAL SECURITY: Administration forces House passage.

COAL CONTRACT: Negotiations resume.

DELIVERED PRICING: Bill stymied.

produced in the U. S., has been dropped by the Senate. Introduced by Senator McCarran of Nevada, this bill had been added as an amendment in the Finance Committee to an Administration measure establishing foreign trade zones.

The zinc amendment was vigorously opposed by Senator Donnell (Rep., Mo.) and was rejected by a voice vote. Donnell declared that approval of such a measure would mean that Congress was establishing a principle "by which raw material might be shipped out of the United States to some other country, there manufactured by the use of cheap labor, and then brought back into the United States duty-free."

Wage-Hour

Now subject to House and Senate action is the conferees' report of October 14 on Wage-Hour legislation. This conference bill establishes a new statutory minimum wage of 75¢ per hour. It contains a definition of "produced" which limits coverage of the Act to employes in "any closely related process or occupation directly essential to 'production'." Further items of importance to mining are a definition of "regular rate" designed to prevent any future "portal-to-portal" or "overtime-on-overtime" type of liabilities, and authority for the Administrator to sue in the name of employes for back wages. This latter authority is restricted in that (a) it must be authorized in writing by each employe; (b) the employe must waive his claim for double damages under another section of the Act, and hence can ask for only actual wages due; (c) the Administrator may not bring suits to test the coverage of the Act, but can only bring them to collect what settled law already says is due anyway; (d) the suits must be prosecuted individually for each individual employe—no blanket actions.

Social Security

An Administration drive on the Social Security bill, H. R. 6000, discussed in the September JOURNAL, resulted in passage of the measure October 5 by a House vote of 333 to 14. No action is expected on this measure in the Senate during the present session.

The House Committee on Rules sent the bill to the floor under a closed rule which was adopted by the House 189 to 135. An effort by Representative Kean (Rep., N. J.) to recommit H. R. 6000 and substitute his more moderate form of bill was defeated by a vote of 232 to 113.

Kean's bill would have increased the present 1 percent tax on employes' pay and employers' payrolls to 1½ percent January 1, 1950, to 2 percent for each on January 1, 1951, to 2½ percent each in 1970 and to 3 percent each in 1980. This measure would have eliminated the H. R. 6000 proposal for permanent and total disability benefits and retained the Gearhart resolution as passed by the 80th Congress.

It is anticipated that the Senate Committee on Finance will conduct extensive hearings on Social Security legislation in 1950 and that a final bill, when enacted, will differ materially from the House-passed version.

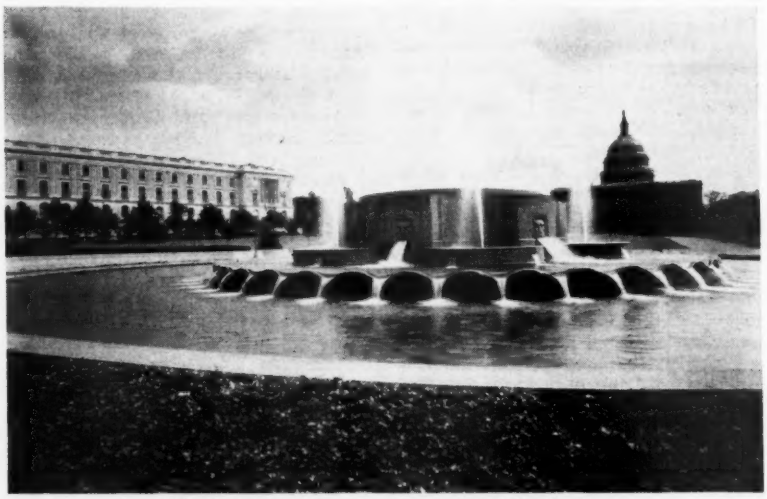
Coal Contract

An order by UMWA John Lewis suspending payments from the miners' Welfare and Retirement Fund resulted in a total suspension of operations at union controlled anthracite and bituminous mines on September 19. On September 30 Lewis ordered miners in the anthracite region and in all districts west of the Mississippi to return to work October 3. Federal Mediator Cyrus Ching on October 7 brought George H. Love, president, Pittsburgh Consolidation Coal Co.; Joseph E. Moody, Southern Coal Producers Assn., and Harry Moses, president, H. C. Frick Coke Co., together with Lewis and the operator-miner conferences were resumed October 12. The miners are understood to be holding out for higher welfare fund contributions, higher wages, and a shorter work week. The operators are reported to stand firm in their refusal to exceed the old contract terms and to insist that the "willing and able" clause be changed and that the "memorial" clause be eliminated.

And Where Does It End!



Washington Daily News.



U.S. Capitol seen from fountain facing Union Station

Delivered Pricing

On October 14 the House by a vote of 200 to 104 approved the report of the House-Senate conferees on S. 1008, the O'Mahoney Delivered Pricing bill. The measure now awaits the action of the Senate, where opponents of the conferees' report, particularly Senator Long (Dem., La.) and Senator Douglas (Dem., Ill.), are expected to conduct a long debate against it.

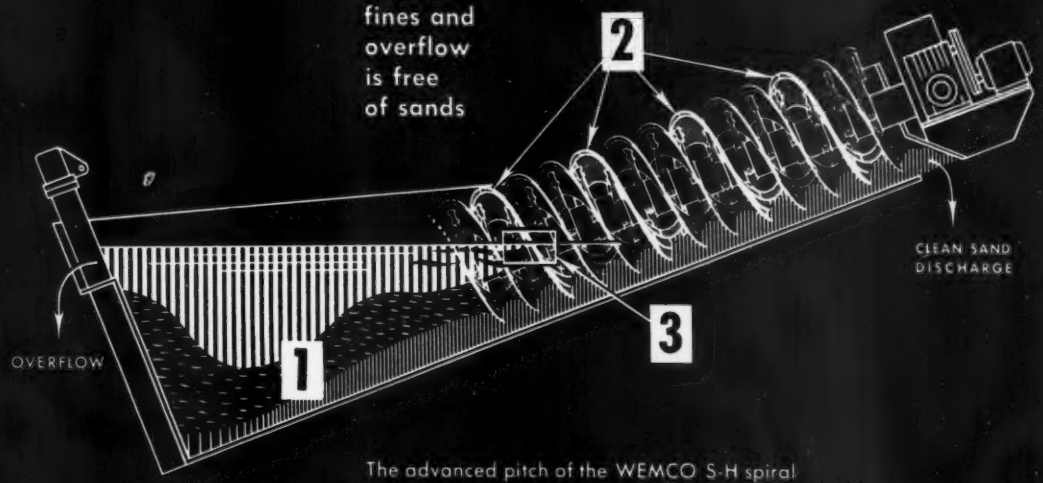
In its pending form the bill provides that it is not an unfair method of competition nor an unfair or deceptive act for a seller, acting independently, to quote or sell at delivered prices or to absorb freight. It is specifically stated that the bill does not make lawful any combination, conspiracy or collusive agreement or any monopolistic, oppressive, deceptive or fraudulent practice carried out by or involving the use of delivered prices or freight absorption.

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A. T. Barr, on September 1, became general superintendent of the New Cornelia Branch, Phelps Dodge Corp. at Ajo, Ariz. He had served as mine superintendent for the last three years. Mr. Barr joined the staff of the New Cornelia Copper Co. as a mining engineer soon after his graduation from the University of Arizona, Class of 1922. He was promoted to the position of chief engineer in April 1926 and continued in that position when the New Cornelia was acquired by Phelps Dodge. On September 1, 1946, he was promoted to mine superintendent.


A. T. Barr

J. A. Lentz has been named to succeed Mr. Barr as mine superintendent. Mr. Lentz has been a member of the New Cornelia staff since February 1935, and has held the positions of mining engineer, assistant chief engineer, chief engineer, and assistant mine superintendent. He has served in the latter post since March 1, 1949.

J. A. Saxe has retired as director of engineering of the Island Creek Coal Co., Pond Creek Pocahontas Co. and Marianna Smokeless Coal Co., a position he had held since 1940. Mr. Saxe was formerly chief engineer for the Industrial Collieries Co. at Ellsworth, Pa. **F. C. Menk** was promoted to the position of director of engineering vacated by Mr. Saxe.

H. J. Steinbuchel, Jr. and **F. J. Hitchcock,** mining engineers, have joined the Oliver Iron Mining Co.'s training division as trainees.

Paul Weir, president of Paul Weir Co., Inc., mining engineers and geologists, Chicago, Ill., left the first part of September for a five weeks' inspection of coal mining developments for the Turkish government. Mr. Weir is supervising the work of a five-man team of American mining engineers, geologists, and management consultants who are reviewing plans and specifications for modernization of key mines in the Turkish Zonguldak field with American equipment and methods. Before returning to this country, Mr. Weir will tour mines in Great Britain to check progress of test installations of American equipment and methods in British mines.

F. J. Downey, who has been superintendent of the Mount Isa smelter in Australia for the past two years, has returned to the United States and will resume his position as superintendent of the Hayden Smelter, American Smelting and Refining Co., Hayden, Ariz. **M. L. Plass,** superintendent at Hayden during Downey's absence, will leave the United States shortly for Mount Isa.

Ben H. Sloan has been elected vice-president in charge of sales of Utah Fuel Co. and its subsidiaries. Mr. Sloan joined the company in 1936 and was appointed general sales manager in 1941.

C. K. Lenz was elected president and sales manager of Kennecott Sales Corp. to succeed **C. T. Ulrich,** who was recently appointed chief executive officer of Kennecott Copper Corp. Mr. Ulrich will continue as a director of Kennecott Sales. **S. S. Jackson** was elected vice-president of Kennecott Sales and **H. E. Westlake** was appointed vice-president and assistant sales manager.

James D. Francis, vice-president, American Mining Congress, and chairman of the board, Island Creek Coal Co., has been named to the nominating committee of the United States Chamber of Commerce Board of Directors to nominate officers of the Chamber for election for 1950. Mr. Francis has long been a director and member of the Chamber's Natural Resources Committee.

Robert C. Wallace has been appointed superintendent for the Cooley district of Butler Brothers. He was formerly superintendent at the Hurley, N. M. plant of the Kennecott Copper Corp.

Thomas L. Aitken has been appointed general manager of the Ebensburg Coal Co., Ebensburg, Pa., succeeding **Robert M. Fleming** who retired September 1.

The **Foote Mineral Co.** has added five new men to its organization. **Harry B. Hunter** joined the research and development laboratory as a metallurgist. **J. M. Kishel** joined the laboratory as a chemist in the analytical section. **Edward Loveland** is a ceramic research assistant. **Dr. Everett R. Johnson** is a research chemist and **David Coghlan** will work as a chemical engineer to conduct pilot plant studies.

Arno C. Fieldner, chief of the fuels and explosives division of the U. S. Bureau of Mines, was honored with the Distinguished Service Award and Gold Medal by the Department of the Interior, in recognition of his notable contributions to fuel technology and of more than 40 years of exemplary public service.

Lamar S. Hill has been appointed superintendent of ore haulage at the Utah Copper Division of Kennecott Copper Corp. He succeeds **N. E. McKinnon,** retired. **J. W. Richardson** will be advanced from trainmaster to general foreman in the mill ore haulage department.

T. G. Gerow has been elected president of the Illinois Coal Operators Association to fill the vacancy created by the death of George F. Campbell. Mr. Gerow is executive vice-president of the Truax-Traer Coal Co., Chicago, Ill. He served as chairman of the 1948 AMC Coal Convention.


T. G. Gerow

H. H. Schou, chief engineer for the mines division of the Copper Queen Branch, Phelps Dodge Corp., Bisbee, Ariz., resigned September 1 to accept a position with a subsidiary of the British-owned Gold Fields of South Africa operating near Medellin, Colombia. Mr. Schou, who has been on the Phelps Dodge staff for about 11 years, only recently was named chief engineer to succeed **Grover C. Pidgeon,** retired. **Herbert Z. Stuart** will succeed Schou as chief engineer. Stuart, a Colorado School of Mines man, has been with the Copper Queen Branch for 13 years, serving underground in a number of different capacities.

The **Olga Coal Co.** has announced the following changes in supervisory and administrative personnel effected September 1, 1949, at its operations in McDowell County, W. Va., which were formerly operated by Carter Coal Co. **Wm. A. Laird,** formerly mine foreman at Olga No. 1 Mine, was appointed superintendent. He was succeeded as mine foreman by **Homer Hickam,** formerly production foreman at the same mine. **P. D. Turner,** formerly mine foreman at Olga No. 2 Mine, was appointed superintendent. He was succeeded as mine foreman by **D. C. Horton,** formerly production foreman at the same mine. **H. M. Turner,** formerly mine foreman at Caretta No. 5 Mine was appointed superintendent-mine foreman at that operation. **Jack W. Rose,** formerly gas inspector at Olga No. 1 Mine, was appointed mine inspector at Olga No. 2 Mine, and **J. H. Parrott,** formerly section foreman at Olga No. 2 Mine, was appointed mine inspector at Olga No. 1 Mine. Mr. Rose and Mr. Parrott will make safety inspections under the supervision of safety director, Wm. Norris, Jr.

David C. Minton, Jr., assistant to the director of Battelle Memorial Institute, Columbus, Ohio, has been named executive in charge of sponsor relations and projects development. He will act in a liaison capacity between Battelle and industrial and governmental sponsors conducting research at the Institute.

Frank H. MacPherson, former manager of the Polaris-Taku Mining Co. of Vancouver, B. C., has been appointed manager of the AEC Raw Materials Office at Grand Junction, Colo.

James W. Morgan has been appointed vice-president and general manager of the Ayrshire Collieries Corp., succeeding **J. B. F. Melville,** retired. Mr. Melville retires after 24 years of service with Ayrshire and one of its predecessor companies, the Electric Shovel Coal Corp. He continues as a director of the Ayrshire group.

Harold McKinley has been appointed plant manager at the Bishop, Calif., operations of United States Vanadium Corp.

Richard Relf, formerly executive vice-president, has been named president of Northwestern-Hanna Fuel Co. He succeeds **John R. Warner,** who was elected chairman of the board. **J. T. Crawford** has been named vice-president in charge of operations and **Martin Burke, Jr.,** vice-president in charge of sales.

Jesse C. Johnson, assistant manager of the AEC Raw Materials Operations Office has been appointed to the newly-established position of deputy manager, AEC Raw Materials Operations Office. Mr. Johnson will assist in administering the entire AEC program for the acquisition and production of all raw materials used in the national atomic energy program.

Edward L. Grady has resigned as vice-president of Pittston Co. Mr. Grady plans to start his own coal mining and sales organization.

David Baker, formerly manager of tungsten operations for the United States Vanadium Corp., resigned as of September 1. He may be reached at Box 65, Bishop, Calif., where he is engaged in private consulting practice. At present he is on a tour of mining operations in Canada and the United States.



David Baker

The recent reorganization of the U. S. Bureau of Mines on a regional basis was accompanied by the appointment of several officials to be fully responsible for all Bureau activities in regional areas.

Joseph H. Hedges, former superintendent of the southwest experiment station at Tucson, has assumed new duties as chief of the new mineral division of the Bureau.

Sinclair H. Lorain, former chief of the Albany, Ore. branch of the Mining Division of the Bureau, was appointed regional director of Region I which comprises the Territory of Alaska.

Stephen M. Shelton was named regional director of the Northwest region. Known as Region II, it includes Washington, Oregon, Idaho, and Montana. Regional headquarters will be at Albany, Ore., where Mr. Shelton formerly served as chief of the metallurgical branch.

Harold C. Miller, formerly supervising engineer of the Bureau of Mines petroleum field office at San Francisco, Calif., has been appointed regional director of Region III with headquarters at San Francisco. Mr. Miller will supervise all Bureau activities in California and Nevada.

John H. East., Jr., formerly engineer-in-charge of the subdistrict office of the health and safety division at Denver, Colo., was appointed regional director of Region IV, which, with headquarters at Denver, covers Wyoming, Utah, Colorado, Arizona, and New Mexico.

Paul Zinner, chief of the Minneapolis, Minn., mining branch of the Bureau, was named director of Region V, which includes North Dakota, South Dakota, Nebraska, Minnesota, Iowa, Wisconsin, and Michigan.

Dr. Clifford W. Seibel, of Amarillo, Tex., supervising engineer of Bureau of Mines helium plants, has been named director for Region VI. Dr. Seibel will supervise all Bureau activities in Kansas, Missouri, Oklahoma, Arkansas, Louisiana, and Texas.

Harold P. Greenwald as director of Region VIII is responsible for Bureau activities in an area that extends from the west boundary of Illinois to Maine and from the Great Lakes to the northern borders of North Carolina and Tennessee.

J. T. "Tom" Clark, who worked for 50 years in the coal mines of Pittsburgh and Eastern Ohio has retired. He was divisional superintendent of Pittsburgh Coal Co.

Eleven representatives from the United States attended a three-nation technical conference on problems of locating, mining, and processing radioactive ores held in London, England in September. The conference between the United States, the United Kingdom, and Canada was attended by Dr. **Charles K. Leith,** Dr. **Arthur P. Butler,** Dr. **Glenn Clewett, Donald L. Everhart, Thorold F. Field,** Dr. **A. M. Gaudin,** Dr. **W. Hirshkind,** Dr. **Thomas B. Nolan,** Dr. **John C. Rabbitt,** Dr. **Bertram D. Thomas,** and **Evan F. Wilson.**

Donald R. Haake, formerly employed in the production department of the Rochester & Pittsburgh Coal Co., is now employed as industrial engineer for the Valley Camp Coal Co., Wheeling, W. Va.

J. A. Doyle, supervising engineer, Erie Mining Co., Mesabi iron range, has retired.

J. W. Woomer & Associates, mining engineers, announces the expansion of its Wheeling, W. Va. office by the addition of quarters on the ninth floor of the Union Trust Building, Pittsburgh, Pa.

Gailen T. Vandel has resigned as president of the Mining Association of Montana, having joined the staff of Cerro de Pasco Copper Corp. in Peru. The executive committee has elected **O. P. Chisholm,** Helena, Mont., who was first vice-president, to fill the post of president.

— Obituaries —

On September 9 a tragic air crash took the lives of three mining industry leaders. **E. T. Stannard,** 68, who had been president of the Kennecott Copper Corp. since May 1933 was scheduled for early retirement from this post. Mr. Stannard had a long and active career in the mining industry and had been associated with Kennecott interests since 1911. After a period of years in Chile and in Alaska he was transferred to New York in 1930 and subsequently became president of the corporation.

Arthur D. Storke, 55, former president of the Climax Molybdenum Co. was scheduled to succeed Mr. Stannard as Kennecott head at the end of 1949. He had been associated with Climax since 1917 and became its president 29 years later. He left Climax Molybdenum Co. on July 1 to join Kennecott.

Russell J. Parker, 53, vice-president of the Kennecott Copper Corp. and president of the Quebec Iron & Titanium Co. had early experience in Africa in both the diamond and copper mining industries. He joined the Kennecott firm in 1942 as assistant to the president and in 1948 was named vice-president.

These three gentlemen were held in the highest esteem by the entire mining industry. Their outstanding characters, abilities, and attainments have left their stamp on many phases of mining. Both the industry and the public have suffered a grievous loss in their untimely deaths.

Edward M. Gatliff, vice-president, Gatliff Coal Co., and director, High Splint Coal Co., died September 13 of a heart attack at his home in Williamsburg, Ky.

William Elliston Farrell, 79, founder and chairman of the Easton Car & Construction Co. of Easton, Pa., died August 22. Mr. Farrell was an early pioneer in the field of industrial mechanized handling and an international authority on the design and standardization of mine and industrial transportation equipment.

After 21 years of varied experience, Mr. Farrell started in business for himself in 1912. In 1913 he purchased the manufacturing business of Ernst Weiner & Co., and in 1914 incorporated this business as the Eastor Car & Construction Co. He served as president of the company until 1946, when he became its chairman.

Mr. Farrell patented the revolutionary doorless two-way dumping pan (Phoenix Car) which is now used in many parts of the world. He also pioneered the use of trucks and trailers in open-pit quarries, again featuring the pan body.

William J. Richards, former president of Philadelphia and Reading Coal and Iron Co., who in 1882 was a chainman in the engineering corps of the same company, died recently. In 1889, Mr. Richards became chief engineer of the Lehigh and Wilkes-Barre Coal Co., advancing to general superintendent and then to general manager. He returned to Philadelphia and Reading Coal and Iron Co. in 1903 as general manager and from 1906 to 1914 served as vice-president and general manager. He was president of the company from 1914 until his retirement in 1927. Mr. Richards also served as a member of the Mine Cave Commission and the Board of Conciliation.

Walter Stalder, consulting petroleum geologist of Oakland, Calif., died on March 15. He worked with the Nevada Petroleum Co. from 1909 to 1913, except for the year 1911 when he engaged in land valuation with the Union Oil Co. of California. The fundamentals of the present decline curve method of estimating oil reserves were developed on this job. During 1914 and 1915, Mr. Stalder resumed valuation work for the Independent Oil Producers. From 1916 until his death he was an independent consultant.

D. G. Brown, vice-president of Humphreys Gold Corp., Denver, Colo., died September 9. On joining Humphreys, Mr. Brown took charge of gold placer mining operations at Alden Gulch, Virginia City, Mont. He later managed the company's placer mining activities in California and the production of chrome sand concentrate in Coos County, Ore., in 1943. In 1944, Mr. Brown directed the company's production of ilmenite, rutile, and zircon near Jacksonville, Fla. In 1948 and 1949 he supervised the building and operation of the large plant at Trail Ridge, Fla. for similar production.

Lee Bundy, 41, metallurgist for Day Mines, Inc., died on August 14 of a heart ailment. Prior to his association with Day Mines, Inc., Mr. Bundy had worked in mills and laboratories throughout the west as well as for the La Luz property at Nicaragua, Central America.

Louis W. Huber, vice-president of National Mine Service Co., died August 17. Since graduation from the University of Illinois in 1921, Mr. Huber had been closely identified with the mining industry in teaching, sales, and consulting capacities. He was once a member of the faculty of the University of Illinois and Carnegie Institute of Technology. An authority on mine ventilation, Mr. Huber was also active in safety and mine rescue work. From 1928 to 1948, he was associated with Mine Safety Appliances Co., where he rose to position of district manager. In May of 1948, Mr. Huber was elected vice-president of National Mine Service Co. in charge of all its divisions and operations in Kentucky, Illinois, Tennessee, and Indiana.

Sheldon Smillie, mining engineer for the Peter F. Loftus Corp., Pittsburgh, Pa., died September 18. Mr. Smillie was well known in the mining industry having served as manager for the U. S. Fruit Co.'s mines in Aspen and Central City, Colo.; as manager of the National Metal Co. In Mexico City; and as chief engineer of the Quincy Copper Co. in Hancock, Mich.; as well as engineer for several coal properties.

Fenton W. Barrett, 75, retired vice-president of the Pittston Co. and one-time president of the Globe Coal Co., died August 3 at his home in Evanston, Ill.

Arno S. Winther, 67, former general manager of Miami Copper Co., died on August 20 at his home in La Jolla, Calif. He had served as consulting engineer for the Miami organization since his retirement in May 1944.

Mr. Winther was born in Fergus Falls, Minn., in 1882. He received his mining engineering degree at Minnesota University with the class of 1903. He was named general manager of Miami Copper Co. in 1936, and during the succeeding years was largely instrumental in the development of that company's subsidiary, the Castle Dome Copper Co.

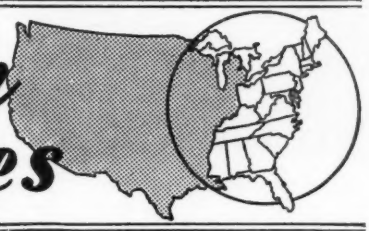
Among other positions he held during his varied and successful career were: engineer for Bingham and Tintic Mining Co. of Utah; chief engineer for Cerro de Pasco Mining Co., Peru; superintendent of the Utah Consolidated Mining Co.; manager of United Comstock Mines Co., Nev.; general manager of California Zinc Co.; general manager, Rawley Mines, Inc., Colo.; general manager, Anna Beaver Mines, Okla.; general manager, Rhokana Corporation, Rhodesia, Africa; and manager of Bwana Mkubura, Rhodesia, Africa.

Fred W. Christman, 63, mining engineer and special coal and farm agent for New York Central Railroad Co., died September 27. Prior to his recent assignment, Mr. Christman worked in Brazil, Ind., and Danville, Ill., coal fields. He was influential in the development of the southern Illinois No. 5 coal seam.

NEWS and VIEWS



Eastern States



Weirton Mine Nears Production

Completion of National Steel Corp.'s new Weirton Mine, eight miles south of Morgantown, W. Va., is scheduled for early 1950.

A two-mile tunnel connecting the mine's surface plant and river docks is now being prepared for installation of the world's longest single-unit coal conveyor system. Driven by one 200-hp electric motor with no intermediate drive or transfers, the conveyor is 10,900 ft long from head to tail pulleys. The specially designed, steel cord belt is 30 in. wide and, operating at a speed of 300 fpm, will transport 200 tons of coal per hour.

Coal from the Weirton Mine will be transported about 130 miles down the Monongahela and Ohio Rivers to the plant of the Weirton Steel Co., a division of the National Steel Corp. The coal will be processed into coke and the entire output will be devoted to metallurgical use.

Allard Lake Progress

New Jersey Zinc Co., together with the Kennecott Copper Corp., reports good progress at the iron-titanium ore deposit in the Allard Lake region of Quebec. Twelve of the 26 miles between St. Pierre and the mine have been graded for the railroad right of way. Steel bridges over the two intervening rivers will be completed by winter. The docks at Havre St. Pierre will be completed at the end of the year. At Sorel, the site of the electric furnace plant for smelting the iron-titanium ore and temporary company offices have been completed.

BCI Runs Continuous Miner

The first successful runs of the continuous miner experimental unit of Bituminous Coal Research, Inc., were announced at the annual convention of the National Coal Association in New York on October 7. The unit was designed and constructed at the Huntington, W. Va., engineering laboratory.

Fuels Conference Held

The coal division of the AIME and the fuels division of the ASME held the twelfth fuels conference at French Lick, Ind., October 26 and 27. A symposium on dewatering and drying coal and two technical sessions were held. An inspection trip was made to Central Indiana Coal Co.'s Maid Marian mine.

Kanawha Valley Safety Meet

At the annual safety meet of the Kanawha Valley Mining Institute on September 16, at Montgomery, W. Va., the program featured contests by mine rescue teams and the execution of a variety of safety measures. Speakers on the program included Arch J. Alexander, chief of the State Department of Mines; Harry G. Kennedy, secretary, Kanawha Coal Operators Association; and R. E. Overly, president, Kanawha Coal Operators Association.



First aid team tackles a problem

CUT HAULAGE COST

...per
YEAR

...per
MILE

...per
TON!

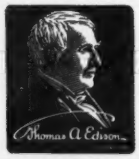


When EDISON Nickel-Iron-Alkaline Storage Batteries power your mine haulage equipment, they help you cut haulage cost in several ways. Their unequalled dependability gives the closest approach to failure-free, uninterrupted haulage it is possible to obtain. That's because their all-steel cell construction withstands rough usage; their alkaline electrolyte is a preservative of steel; their electrochemical principle of operation is free from self-destructive reactions.

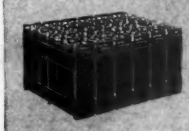
They do not require critical adjustment of charge rates—can often be charged direct from the d-c power supply. They can be fully recharged in six to seven hours, which helps get all charging done during off-peak periods.

Get a current EDISON price quotation—you will probably find initial cost *much lower* than you think. Couple this factor with well-known EDISON long life and you will have the key to year-after-year economy.

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES: They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.



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EDISON STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated, West Orange, N. J.
In Canada: International Equipment Co., Ltd., Montreal and Toronto

Foote Expands Facilities

A new building to house its research and development department has been purchased in Berwyn, Pa., by the Foote Mineral Co., and will be occupied within the next two months. Adequate laboratories, library, shop facilities, and special equipment will be provided to carry out present and future research and development programs.

Titanium Now Available

Pure titanium in relatively large amounts has been produced by Allegheny-Ludlum Steel Corp. The metal has been poured in ingots of 65 lb, and 400-lb ingots appear possible in the near future.

The metal is reported available in experimental lots in strip, bar, and wire form. Present prices are estimated at from $5 to $20 per pound, but lower prices are predicted with further development. Research on the metal is being conducted at the Allegheny-Ludlum Watervliet, N. Y., works.

Stainless Steel Conveyors

Basic fundamentals of the use of stainless steel conveyor belts have been found sound in tests conducted at the Johnstown Coal & Coke Co.'s Crichton No. 4 mine in Nicholas County, W. Va. Tests were conducted under the immediate supervision of Forbes R. Clarke, Jr., project engineer on materials handling for the mining development program of Bituminous Coal Research, and A. B. Crichton, Jr., representing the Johnstown Coal & Coke Co.'s. Conventional rubber belting equipment was used with very slight modification to carry the sheet of stainless steel that formed the belt.

Venezuelan Iron Ore

With work well on the way towards completion of roads, seaports, and conveyor belts, the Bethlehem Steel Corp. soon expects to move high-grade ore from the Venezuelan jungle for ocean shipment to the United States. For the last eight years work has been going on in the area east of Ciudad Bolivar to test extensive iron ore deposits. In addition to Bethlehem Steel Corp., the United States Steel Corp., Republic Steel Corp., and Jones & Laughlin Steel Corp. are interested in the area. The 20,000-acre concession held by Bethlehem Steel Corp. is estimated to contain at least 300,000,000 tons of high-grade ore.

The ore will be trucked over a mountain highway to a primary crusher about midway down from a mountain top where the mine is located. Then it will move on a conveyor belt to a

Annual Conference of the Coal Division

William Penn Hotel, Pittsburgh, Pa., Thursday, November 17, 1949

A CORDIAL invitation is extended to all coal operators and manufacturers interested in the advancement of coal mining to attend the 1949 Coal Division Conference at the William Penn Hotel in Pittsburgh, November 17. At this conference the various committees will meet in open forum to present their reports for general discussion. The purpose is to bring together men from various fields and branches of the coal industry to hear the results of the studies made by the Coal Division Committees and to offer suggestions to make these reports of still further service in promoting higher efficiency and greater safety in mine operation.

The conference will be for one day only—a morning session starting at 10 o'clock, a business luncheon, and an afternoon session, concluding about 5 p. m.

The reports will be submitted in preliminary form, open to such revision as may be accepted by the conference in the ensuing discussions. To assist in the discussion, copies of the reports will be made available to those at the meeting. Each committee has taken a major phase of mining for study, breaking the general subject into several component parts which are being handled by special subcommittees, as shown in the following schedule:

Handling Mine and Cleaning Plant Refuse—Prevention of surface fires—Slate disposal equipment—Refuse practices in strip mining—Anthracite methods.

Roof Bolting—Equipment and material—Operating practices—Safety—Application to pitching seams—Geologic factors.

Continuous Mining—Training of personnel—Mine projection—Haulage—Roof support—Safety.

Underground Power—Cable insulation; A.C. underground; Color coding; Power controls for belt conveyors.

Belt Care and Maintenance—Handling and Storage—Installation—Lubrication and inspection—Methods of loading—Belt reversing.

Labor Savings in Track Construction and Maintenance—Prefabricated track—Rail joint welding—Treated ties.

secondary crusher. There hoppers will carry the ore in 2500-ton trainloads over a standard gauge railway to the Orinoco River camp at Palua. At the end of the line, the ore will be dumped into a battery of bins. A conveyor belt will feed ore from the bin to a loading bridge projecting out over the Orinoco River. From there ore will be dumped into 4000-ton flat barges for the 36-hour trip to the mouth of the river and the transshipment point at Puerto Hierro.

Largest Open Hearth

The biggest stationary open hearth furnace in the history of the steel industry has been placed in operation at the plant of the Weirton Steel Co., Weirton, W. Va. The furnace is Weirton's No. 1 which has been rebuilt and enlarged from a former capacity of 200 tons to a new capacity of 550 tons.

The capacity of the new Weirton furnace is more than three times as large as the average capacity of open hearth furnaces currently used in the steel industry. The rectangular structure is built chiefly of steel, concrete, refractory brick, and other refractory materials. Its over-all dimensions are: length, 96 ft, 6 in.; width, 29 ft, 3 in. at the center and 24 ft, 6 in. at the ends; height, 15 ft from the hearth floor to the top of the furnace.

Coal Gasification Tests Continue

Despite the announcement of successful extraction of petroleum from oil shale in Rifle, Colo., the Bureau of Mines and the Alabama Power Co. plan to continue their underground coal mine gasification experiment at Gorgas, Ala. The Colorado development is not expected to affect the work at Gorgas or the experimental work being done at the large pilot plants at Louisiana, Mo. in converting coal to gasoline. If production of the synthesis gasoline by the underground firing method becomes feasible, it will reportedly become directly competitive with the gasoline from petroleum or shale oil.

Safety in Coal Mining

Recently, the National Coal Association congratulated the men and management of the coal mine at Blue Diamond, Ky., for having operated for nearly five years without a fatal accident. In that period, the Blue Diamond Mine produced more than 4,000,000 tons of coal and the miners worked more than 6,000,000 manhours without a fatal injury.

Many other mines have established long unbroken records of fatality-free production and some records extend over more than a dozen years. Usually, 90 percent of the nation's coal mines have no fatal accidents in the course of a year. With the consistent downward trend of mine accidents, the miners' job has been made more than twice as safe as it was 40 years ago. The all-time record was set in 1948 and so far in 1949 the record has been improved.

Wollastonite Development

Wollastonite, a new industrial mineral with a wide range of possible applications in commercial and industrial products, is being studied and developed by the New York State College of Ceramics. The mineral was quarried and beneficiated by the College under a research project of the Office of Technical Services of the U.S. Department of Commerce. Wollastonite occurs in substantial deposits in New York State.

Alcoa Mining Extends Holdings

The Alcoa Mining Co. has purchased the Blue-and-Marble fluorspar property in Livingston County, Ky. The additional acreage added to the fluorspar division of the Alcoa Mining Co. of Rosiclare, Ill., is 50 acres. Two usable shafts are located on the property. No plans for immediate development have been made.

New Kentucky Mine

In Knott county, Ky., the Puncheon Creek Coal Co. has opened a new mine on the C & O Ry. The new company is financed by local mining men. The president of the company is John E. Bowman, president of Utilities Elkhorn Coal Co. The Puncheon Creek mine was the first to start production on the new C & O extension. The mine is completely mechanized. In the same area is the nearly completed mine of Consolidation Coal Co.

Airplane Aids Coal Stripping

To aid in supervising and servicing coal stripping operations, George H. Yoxtheimer of Punxsutawney, Pa., utilizes a four-place Ryan Navion airplane. With one project located near Punxsutawney, Pa., and another near Gillette, Wyo., the airplane makes it feasible for this operator to maintain close contact despite the 1400 miles separating the two operations.

Gold Output Down

The July output of gold declined in July to a total of 3 percent less than was produced in June, according to the U. S. Bureau of Mines. Declines were general, with only three areas—Alaska, South Dakota and Montana—registering gains. Alaska's gain was seasonal. Neither South Dakota's nor Montana's rise was of significant proportion.

Colorado's output dropped 15 percent, Arizona's 14 percent, Nevada's 12 percent, and Utah's 8 percent.

The absence of shipments from the Golden Cycle mill cleanup accounted for the fall in output from Colorado. In Arizona the decrease resulted from cutbacks in outputs of all metals at the majority of properties. Curtailed production at copper mines in Nevada resulted in lowered gold output in that state. The virtual closing of the Park City district in Utah accounted for marked decreases in output of gold and other metals there.

Safety Meet Winners

The Northern Division first aid team of the Glen Alden Coal Co. won first place in the Pennsylvania Statewide Anthracite First Aid Contest, and Pittsburgh Coal Co.'s Mine No. 123



won first in the Bituminous Contest.

The fifth annual Anthracite First Aid Contest was held September 10 at Kingston, Pa. Members of the winning team were Walter A. Smyden, captain; Nathan Jacoby, John Zendzion, Victor Hobbs, Benjamin J. Bala, and Walter A. Connors. The Hazleton Shaft Outside No. 2 team of the Lehigh Valley Coal Co. took second place, and the Raven Run Coal Co. team of Jeddo, Pa., was third.

The seventh annual Bituminous Championship First Aid Contest was held the same day at Ebensburg, Pa. Members of the winning team were Earl Kimmer, captain; Alexander Harvey, Phillip D'Arrigo, Luther Fisher, Robert Kimmel, Robert Harvey, and Steve Waslczak. The Westmoreland Mining Co.'s Watson Mine near Saltsburg, Pa., won second place, and Republic Steel Corp.'s Indianola Mine, Indianola, Pa., was third.

Talc Producer Plans New Plant

The International Talc Co., Gouverneur, N. Y., has made plans to construct a 200-ton mill at Hailesboro, N. Y. at a cost of approximately $1,000,000. The new structure will replace the mill which was destroyed by fire last May. Work has already begun on surveying the site and plans are being revised to suit the location. With the new addition, total production for the company will be stepped up to nearly 400 tons daily.

Coal Tract Leased

The Southern Coal Corp. has leased from the Pocahontas Land Corp. a large acreage of coal in the Sandy River District, McDowell County, W. Va. Mining rights have been granted on 5467 acres on the Bradshaw seam. The area has been thoroughly drilled and the coal found to average about 46 in. in thickness.

The new tract adjoins present leases of 1133 acres on which the Southern Coal Corp. has been operating since 1942. With the acquisition of the additional acreage, Southern Coal Corp. plans to erect a modern tipple and coal cleaning plant with a daily capacity of 3500 tons. To supply the coal washer, the mine will be fully mechanized. The present plant of the company cleans a mine output of approximately 1300 tons daily.

Georgia Feldspar

Near Monticello, Ga., the Appalachian Mineral Co., is producing a number of grades of feldspar from rich deposits located during World War II. The richness and quantity of the ore permits dry recovery methods to be used for a long time to come. Estimates by the operators indicate adequate reserves for ten years before it will be necessary to switch to flotation processes for beneficiation of the lower grade ores. Shot drilling was used to develop more than 750,000 tons of the feldspar ore, and probable and possible reserves are several times that amount.

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Tri-State Mining Resumed

On the signing of a new labor contract with the CIO, mines of the Federal Mining and Smelting Co. in the Tri-State district of Kansas, Oklahoma, and Missouri resumed operations on August 15. Production was resumed at the Duenweg mine and mill and at the Gordon, Lucky Syndicate, Howe, and Ohimo mines at Picher, Okla. Approximately 175 men went back to work.

The contract will run for one year, from August 11, 1949, and thereafter renews itself for successive years unless one of the parties elects to terminate it. Wages are based on a $65 per ton for zinc concentrates and will increase one cent an hour for each one dollar increase in the price of zinc concentrates. Machine men will receive $8.20 per day as a minimum wage.

When the A. F. of L. Cement Lime and Gypsum Workers Union signed its 22-month contract with the Eagle Picher Mining Co. on August 5, a general cut of $3.08 per day was accepted and a sliding scale of wages based on the price of metal rather than the price of zinc ore was agreed upon. The Central mill was serving 18 mines when the shut down came. Operations were resumed by 16 of these and one new shaft went into production. At the same time the Bird Dog mill at Cardin resumed operations. Some 1500 men were put to work immediately. Under the new set-up, the Central mill works two full shifts but will operate only the flotation department on the graveyard shift.

Coal Strike Endangers Copper Mine

A telegram from Endicott R. Lovell, president of Calumet & Hecla Consolidated Copper Co., to John L. Lewis late in September urged the immediate shipment of coal to prevent a shutdown of copper mines in Northern Michigan.

In his telegram Mr. Lovell said that unless the delivery of the winter's coal started immediately, there would not be time to complete delivery before the Great Lakes navigation season closed. This would mean the "almost immediate permanent abandonment of the copper mining operations" in the district since the mines are deep and can not be kept unwatered with the present supply of coal. A copy of the telegram was sent to the President of the United States.

Stripping Program Begun

At the Mahnomen pit on the Cuyuna iron range, Ironton, Minn., the S. J. Groves & Sons Co. has begun removing a large amount of rock from the walls of the original pit. A fleet of trucks and shovels are already at work on the project which will not be completed until 1950.

Slope Sunk Through Sand

During tunnelling of a 15-deg pitch slope, the Alpha Coal Co., near Alpha, Ill., found it necessary to pass through a layer of water-bearing sand approximately 4 ft thick. Mining was brought to a costly stop when water came into the shaft.

To solve the problem, chemical solutions were injected into the sandy ground through specially perforated pipes, thus hardening the soil into a waterproof, rock-like substance which sealed water out of the tunnel. The method used, known as the Joosten process of chemical soil solidification, is named after its inventor, Dr. Hugo Joosten, a Dutch mining engineer.

The basis of the Joosten process is the chemical reaction between calcium chloride and sodium silicate. When combined at the proper concentration these materials almost instantly form a gelatinous precipitate. The cementing action of the combined chemicals makes the treated mass impervious to water.

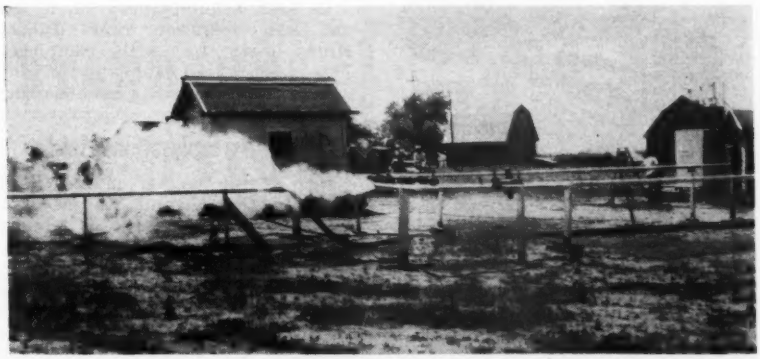
Electrical Coal Gasification

The underground electrocarbonization of coal on a commercial scale is being investigated by the University of Missouri School of Mines and Metallurgy, assisted by the Sinclair Coal Co.

Having proved in laboratory and field tests that coal in place can be turned into gas by sending an electric current through it, extensive field experiments are now being conducted near Hume, Mo., on the Tiger Mine property of the Sinclair Coal Co.

The field tests are aimed at obtaining the valuable constituents of coal, oil, and oil-shale deposits without actually excavating for the source materials. A current, controlled by a water rheostat, is sent down through electrode pipes into a seam of coal about 2½ ft thick. As it is heated, the coal begins to give off oil-saturated gas which comes to the surface through the same pipes which act as electrodes. Much of the moisture is removed as the gas moves through a water collector and, before the gas is discharged through an outlet pipe, it passes into a flow meter and a cooling tower. The carbonization yields a gas rich in oil and of high heat value ranging from 500 to 600 Btu. After the coal bed becomes sufficiently heated, the electric current is stopped and air or oxygen is pumped into the seam to sustain the further combustion.

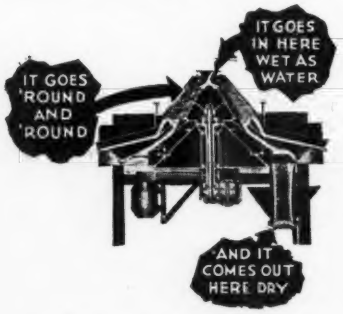
The gas produced by electrocarbonization can be used as a raw material for synthetic production of gasoline or can be converted into a heating fuel.



Gas produced by the electrocarbonization of coal at the Missouri School of Mines field project at the Tiger Mine of Sinclair Coal Co.



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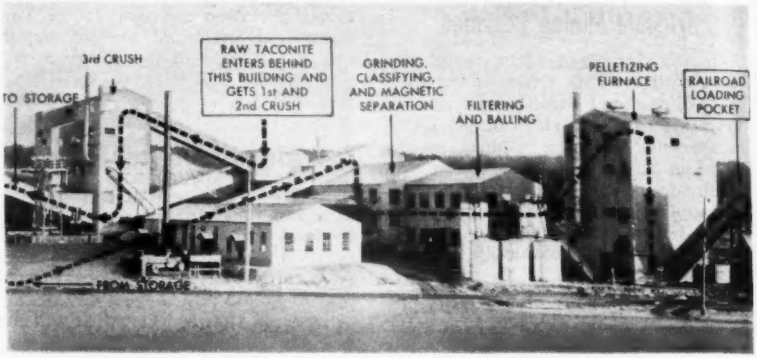
Taconite Beneficiation Plans

In contemplating a plant to produce up to 10,000,000 tons per year of concentrated iron ore from taconite, the Erie Mining Co. has applied to the Minnesota Department of Conservation to obtain a sufficient water supply. If a final decision is reached to build the large plants, the first unit would have the capacity to produce 2,500,000 tons of concentrates a year. If this plant should be operated successfully, plans call for adding a similar unit increasing capacity to 5,000,000 tons a year. As further depletion of available direct-shipping ores occurred, other units or another separate plant to produce an additional 5,000,000 tons a year could be added to eventually involve construction of a plant or plants able to produce 10,000,000 tons of concentrate annually.

In 1948 a preliminary plant was put into operation near Aurora, Minn., using full scale equipment. This plant, with a capacity of 200,000 tons of concentrates a year, has been operated intermittently for the purpose of making equipment tests. If the larger plants are built, they will be designed to use processes similar to those now in use at the preliminary plant.

The process now being experimented with reduces three tons of taconite rock to one ton of pellets containing from 63 to 65 percent iron. The crude taconite passes through a series of dry-crushing and wet-grinding operations which pulverize it so that the iron particles can be separated magnetically from the waste siliceous material. To make a suitable charge for the blast furnace, the fine iron concentrate is then rolled into walnut-size pellets that are baked at high temperature to a strength adequate to withstand the journey from the plant to Upper Lakes docks, down the Great Lakes to blast furnaces.

In the mining of taconite, the Erie Mining Co. is experimenting with jet-piercing for putting down blast holes.



Preliminary plant of the Erie Mining Co. for taconite beneficiation

Kansas Explorations Sold

One of the largest mining deals made in the Missouri-Kansas-Oklahoma field was consummated recently when George W. Potter bought the leases, mills, and fee holdings of the Kansas Explorations, Inc., a subsidiary of the St. Joseph Lead Co. About 400 acres of fee-held land were included in the transaction plus 300 acres of mining leases, and two mills, both in Missouri. One was the Jasper mill on the north side of the West Seventh Street road near Central City. This mill has a capacity of 1,200 tons per 24 hours. Also included in the deal was the 800-ton Snapp mill on the Buckingham mine about one mile north of Oronogo, Mo. The Snapp mill is on 80 acres of mining land. The Ritz mine at Cardin, Okla., was included in the transaction and much mining equipment at various points. At one time the Kansas Explorations, Inc., was one of the largest producers in the district but has done little operating during the last year.

For about 30 years Mr. Potter was connected with the Eagle-Picher Mining & Smelting Co. In September, 1944, he left the company and since then has limited his mining investments to small mines on the Barnsdall land which he owns. More recently he has operated the North Side mill at Chitwood, a suburb of Joplin. This mill operated as a custom mill.

The return to production of the properties previously owned by Kansas Explorations, Inc., will make Mr. Potter one of the largest operators in the district.

Slope Mine Readied for Production

Franklin County Coal Co. recently announced that its new slope mine, the Lida B., will be ready for production about November 1. The mine is located near Royalton, Ill.

Steep Rock Plans Higher Output

Production of 4,000,000 tons of iron ore a year by 1954 is expected by Steep Rock Iron Mines, Ltd. While the Hogarth mine is being developed, the present Errington mine will be maintained at a 1,200,000-ton level. Expanded production is scheduled to begin in 1952. Both mines are located under the drained bed of Steep Rock Lake, Canada, 142 miles west of Fort Arthur.

Fairmont City Smelter Reopens

After being closed down by a strike since August 1948, work was resumed at the Fairmont City smelter of the American Zinc, Lead & Smelting Co., Fairmont City, Ill. on September 6. Reconditioning of the plant was started immediately and the first production of acid and cadmium took place in the latter part of September.

Modern Plant Sizes Iron Ore

At its Armour No. 2 mine at Ironton, Minn., on the Cuyuna iron range, the Inland Steel Co. has placed in operation a new screening and crushing plant. One unit of the installation screens and crushes and a second unit comprises a bin for gravity loading of sized iron ore into railroad cars. Ore passes from the first to the second unit over an inclined 30-in. conveyor belt.

Ore is delivered by truck to the dumping platform at the top of the screening unit where it is fed by a pan conveyor over a vibrating screen with over size passing a 30 by 42 in. jaw crusher.

C & H Reopens

The Michigan mines of the Calumet & Hecla Consolidated Copper Co. were reopened September 6 after a several months shut down. A 15 percent wage cut was announced, but the company stated its willingness to augment wages when the copper price reached 19½¢ per lb.

Lake Ore Movement

The season's record for Great Lakes' shipping as of September 1 shows the largest postwar movement with 57,268,216 gross tons shipped. This figure compares with 54,569,709 gross tons shipped on September 1, 1948. The Lake Superior Iron Ore Association reported shipments of iron ore for the season at 63,199,278 gross tons on September 19. Consumption of iron ore in August increased almost a half million tons over that in July, totalling 5,711,208 gross tons in August.

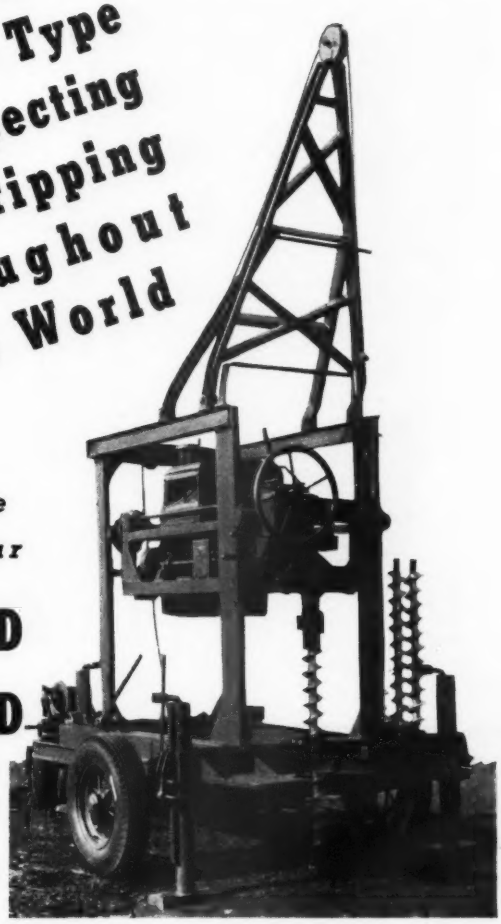
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Eureka Development Program

Following an extensive survey, Ira B. Joralemon has laid out a program for the future development of the Eureka Corp., Ltd., near Eureka, Nev. Work on this property was stopped about a year ago when a flow of water was encountered on the 2250-ft level of the Fad shaft and pumping failed.

The proposed program calls for churn drilling from the surface together with diamond drilling from the 800-ft level to test the possibility for finding ore on or above the 1700-ft level; unwatering to the 1700-ft level and later to the 2250-ft level, and shipment of high grade ore to a custom mill and smelter at the earliest possible date.

A more reasonable lease from the Richmond-Eureka Mining Co. is essential before starting the program. Mr. Joralemon estimated that, if large orebodies are found on or above the 1700-ft level, a total expenditure of less than $1,450,000, plus the cost of a treatment plant would be necessary.

Mr. Joralemon stated, however, that if no ore was found above the 1700-ft level, the venture would be less attractive. He added that, while there is a remote chance that the flow of water may be so great that the cost of development and mining would be prohibitive, it was also likely that large-scale production from deep ore bodies could be begun at a total cost of $2,650,000, plus the cost of a treatment plant.

Roundup Coal Mine to Reopen

The Sheridan-Wyoming Coal Co. of Monarch, Wyo. has purchased all the coal lands, equipment and other physical property of the Roundup Coal Mining Co. near Roundup, Musselshell County, Mont. S. H. Clarke, president and general manager of the Roundup company for many years will be retained as general manager by the new owners, as well as many former employes of the former operators. The property includes the well-known No. 3 mine which has produced the "Bucking Bronco Roundup Coal" since 1908. This mine has been closed since May 31, pending outcome of the negotiations. Production was expected to be resumed by September 1. The Sheridan-Wyoming Coal Co. has been operating in northern Wyoming for over 40 years. Present operations include two mines at Monarch, and the Miller mine at Kirby, Wyo. Plans are under way for strip mining in the Sheridan field. Walter J. Johnson is president of Sheridan-Wyoming.

Potash Exploration

The Southwest Potash Corp., a wholly owned subsidiary of the American Metal Co., Ltd., is now engaged in an extensive exploration campaign in the Carlsbad area. Core drilling is being conducted on lease holdings approximately six miles north of the operations of the Potash Co. of America. Victor Bongard is in charge of the work.

The Full Report

of the

1949 METAL MINING CONVENTION

will be published in the NOVEMBER issue

Kinsella Ceases Operations

After 27 years of continuous operation, Mike Kinsella has given up his lease on the upper workings of the Federal Mining and Smelting Co.'s Morning and You Like mines at Mullan, Idaho. When the Federal company purchased the property, the mine was considered pretty well worked out but, by concentrating efforts on deep development, the mines have produced more than $33,000,000 in dividends.

After passing through several hands, the top workings of the You Like eventually came under the direction of Mike Kinsella and were operated through the Midnight tunnel. The You Like lease alone is known to have produced more than $1,000,000 in high grade silver ore that had previously been overlooked. On the Morning lease, Kinsella followed ore stringers in the hanging wall of the old vein and was able to maintain profitable production.

Now that all mining equipment has been pulled out and stored, steady employment for a crew ranging from 10 to 100 men has come to an end.

Clayton Silver Opens New Level

Clayton Silver Mines Co., Wallace, Idaho, is reported to have opened its shear zone in a prospect operation 100 ft below workings on the 300 level, where the ore had an average width of 35 ft. The company's milling plant,



which has been in continuous operation for several years, was reconditioned while the mine was being reopened on the 400 level. Having proven the continuation of the orebody, arrangements are now being made to go to deeper levels. The company ships its concentrated product by truck direct to smelters at Salt Lake.

Indians Seek Uranium

Special two-year mining permits are being issued to Indians on the huge Navajo reservation in northern Arizona in an effort to stimulate uranium development on reservation lands, according to a statement by Allen G. Harper, superintendent.

So far, the Vanadium Corporation of America is the only company operating on the reservation which is believed to be one of the principal sources of uranium in the nation. It is producing from five mines and holds leases on several other discoveries. Approximately 100 Navajos are employed.

The Indians are receiving some financial benefit from the uranium production since ten percent of the gross sale price of all minerals produced and sold under reservation min-

ing leases is paid into the Navajo tribal fund. These payments have already amounted to approximately $100,000, it is said.

Under the special permits issued to Indians, no bond is required. However, the Indian is required to pay the same ten percent royalty. Prospectors, other than Indians, who find mineral deposits on the reservation must put their claims up for bid. To date, the Vanadium Corp. has been the highest bidder in each case of vanadium-uranium finds.

Montana Asbestos Development

Processing of asbestos from a rich deposit in the Gallatin canyon near Bozeman, Mont. is expected to begin by December 1, according to C. W. Lester, of Billings, head of the Interstate Products Co. which holds title to claims staked out over 50 years ago. Machinery for the plant will be shipped about October 1. Plans call for processing ten tons of asbestos an hour, and products such as insulation board and shingles will be on the market by next summer. More than 5000 tons of ore are stockpiled at present. The ore is open-pit mined from the highest known top grade deposits in the state. The company had to build a three and one-half mile access road rising 1400 ft since the vein runs up a mountain.

Central Eureka to Resume Operations

In late September, Donald B. Smith, secretary, Central Eureka Mining Co., announced that the company would reopen its gold mine at Sutter Creek, Calif., in the Mother Lode region. From 80 to 85 miners were called back to work, or approximately half of the force that was employed when the company shut down early in September for an operational reorganization.

Miners have agreed to take an average 27 percent wage cut, reducing the basic miners rate from $1.30 per hour to $1.00. Plans call for mining ore of ½ oz grade or better in order to maintain gold production at the same rate that prevailed before the shutdown.

Dayton Consolidated Finds New Ore

Dayton Consolidated Mines Co., has discovered an important gold-silver vein on the 800-ft level of the Keystone mine near Silver City, Nev., it was disclosed by W. J. Henley, president and general manager. He reported that the ore was located by cross-cutting into the hanging wall close to the Silver City fault. Ore averages $34 a ton. Drifting on the vein has advanced 30 ft. Dayton owns several mines on the Silver City branch of the Comstock lode. The company mills 200 tons of ore daily, and is treating custom ore in addition to its own product.

Standard Mine Seeks Radioactive Ore

Work on reopening the 1400-level tunnel at the Standard Mine near Prairie City, Grant County, Ore., is being continued. Previously operated for its copper-cobalt ore, the current work being done on the property is based on the strength of radioactive material found on the dump. Stoping exposed to date has been so thorough that no ore remains to be sampled, however, available maps indicate that the largest area of stoping is ahead of the present cave face. Unless pillars are encountered in the workings yet to be reopened, it may become necessary to sink a series of shallow winzes to expose the vein for sampling. As the Standard vein is reported to have been a strong, heavily mineralized vein never explored below the present tunnel level, radioactivity noted in connection with the dump material is of considerable interest.



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Lucky Friday Taps Blind Vein

The Lucky Friday Lead-Silver Mining Co. at Mullan, Idaho, has found new ore on the 1600 level, where a crosscut revealed two "blind" veins in addition to the original vein which has been productive from the 300 level. The first vein with a width of 12 ft assayed 2 percent lead and 8 oz of silver per ton. The second vein is 7 ft wide with average assays of 11 oz in silver, 2.7 percent lead, 0.2 percent copper and 0.95 percent zinc. The third vein encountered proved to be 6 ft wide at the point of intersection with considerably higher average assays. Lucky Friday has shipped more than $200,000 worth of ore from levels above the 1400 since the first of the current year and is producing about 50 tons daily from that source.

Manganese Exploration

Exploration of the Artillery Peak manganese deposit in southern Mojave County, Ariz., is being undertaken by the U. S. Bureau of Mines as a part of its program to develop a domestic supply of manganese. The Artillery Peak deposit is controlled by the M. A. Hanna Co. of Cleveland, Ohio.

The work will be supervised by Charles A. Kumke, mining engineer with the Bureau at Tucson, Ariz., assisted by Lincoln A. Stewart, mining engineer. Preliminary plans call for the driving of two tunnels in an attempt to develop some of the higher-grade manganese indicated by previous exploration.

Round Mountain Nears Production

Construction is being rushed on the major gravel mining and treatment plant of Round Mountain Gold Dredging Corp. at its leased Nevada Porphyry Gold Mines placer near Round Mountain, Nev. With 90 men employed, some units have been practically finished and the start of gold production is looked forward to before winter. A primary conveyor belt, 1700 ft long, designed to carry a heavy load of gravel at 8 mph has been installed and tested. It will dump its load on a second belt 700 ft long which elevates the material to the top of a stacker 135 ft long. Gravel will pass through a grizzly at the working pit where large boulders will be removed and crushed, thence into a bin which feeds into the primary conveyor.

Mining of the deep gravel deposits will be done by power shovel. The first bench is to reach a depth of 130 ft, with deeper operations to be conducted later with aid of auxiliary conveyors. Much of the gravel extends to depths beyond the reach of a bucketline dredge. Construction of the washing plant is progressing rapidly and installation of several units is scheduled for completion soon. Round Mountain is controlled by Consolidated Gold Fields of South Africa and Yuba Consolidated Gold Fields of California.

Anaconda Phosphate Plant Extension

In response to increasing demand for superphosphate fertilizers in western states the Anaconda Copper Mining Co. has been expanding its plant for the production of this commodity at Anaconda, Mont. The extension of the plant, now practically completed, involves a new contact sulphuric acid plant with a capacity of 150 tons of 10 percent sulphuric acid per day. The phosphate operation extension will use the present process and will involve additional phosphate rock calcining, grinding and leaching units, Lurgi filters, vacuum evaporators, mixers for combination of phosphoric acid and phosphate rock and superphosphate aging, drying and grinding units.

Anaconda, since 1923, has been processing Idaho phosphate rock with sulphuric acid made from concentrates produced at their plant in Anaconda, Mont., for production of 5500 tons of 53 percent P_2O_5 phosphoric acid and 60,000 tons of superphosphate fertilizer per year. Phosphate rock is treated with sulphuric acid for the production of phosphoric acid which is concentrated and applied to further phosphate rock for the production of high grade superphosphate. The new extension is expected to increase phosphoric acid production to 19,000 tons per year and superphosphate production to 100,000 tons per year.

Jack Waite Lease Changed

Leasing arrangements at the Jack Waite mine in the Murray district, Idaho, which is under lease to the American Smelting & Refining Co. have been reversed. Heretofore AS&R has received 65 percent of the net profits and the Jack Waite company 35 percent on account of money due the smelting company. This debt has now been liquidated and hereafter Jack Waite will receive 65 percent and the AS&R 35 percent. The ore produced is a high grade lead product. The portal workings and milling facilities of the mine are in Idaho, but at depth the orebody crosses the state line and production is now coming from Saunders County, Mont.

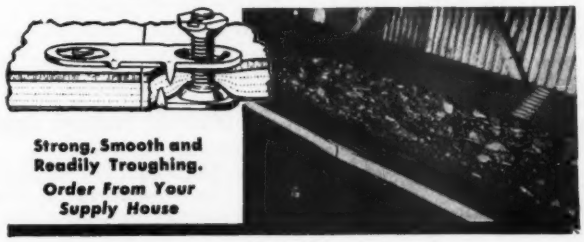


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Industrial Health Conference

The First Rocky Mountain Conference on Industrial Health will be held in the Denver Chamber of Commerce Building, October 31, November 1 and 2, inclusive. This Conference is sponsored by the Division of Industrial Medicine of the University of Colorado School of Medicine, the Colorado State Department of Health, Colorado Manufacturers Association, Colorado Chamber of Commerce, and the Denver Chamber of Commerce. Five sessions have been planned to aid the successful operation of industrial health programs.

Iroquois Mine

Ore from the Iroquois mine, near Leadpoint, Wash., is being milled at the Sierra Zinc (Blue Ridge) mill of Goldfield Consolidated, near Aladdin, C. O. Dunlop announced recently. He is president of the Silver Dollar Mining Co., which is financing the Iroquois project through Mines Management, Inc. which took it over in May 1948.

Hansy Produces Smelting Ore

The Hansy Gold & Copper Mining Co., near Adair, Idaho, now has two carloads of 15 percent copper ore ready for shipment to the Anaconda smelter. New ore bunkers have been completed and the forest service has constructed haulage roads to the mine. The orebodies developed underground indicate that steady shipments can be maintained.

Montana Coal Reserves

A study of Montana coal reserves conducted by the U. S. Geological Survey indicates a tonnage of 221,779,000,000 tons of fuel available needed to supply synthetic fuel plants. About 12 percent of the total reserves, or more than 28,000,000,000 tons of lignite and sub-bituminous coal are known to be present in beds 10 ft thick or more, lying under less than 2000 ft of overburden.

Newmont Expands Activities

About 100 to 125 tons of gold ore are being milled daily by Newmont Mining Corp. at its mill in Goldfield, Nev., and about 25 tons of concentrates weekly are being shipped to a Utah smelter. The company employs 70 men and is completing arrangements for expansion of development at its White Rock property south of Goldfield, where ore has been exposed on two levels. Newmont is also reported to have leased or optioned properties at Rawhide and Candelaria, and is arranging to explore, develop and mine the Candelaria by bulldozer and power shovel. At the White Horse claim, leased by Newmont to the Red Hill Florence Mining Co., W. J. Frank, manager, reports the working of a rich vein 14 in. wide between the 390 and 460-ft levels, with ore averaging $60 to $70 a ton. Sinking of a winze below the 460-ft level has been stopped and the mine crew is now stoping high grade ore. More than 400 tons of $80 a ton ore is reported stockpiled for treatment at the Newmont mill.

Sarita Installs Mill

Completion of a 100-ton mill being built at the Sarita gold mine near Bridgeport, Calif., is expected soon. The property is controlled and operated by the Blackmore-Whinery interests of Winnemucca, Nev. Open-pit workings are reported to contain 85,000 tons of broken material available for power shovel mining. The ore assays $20 a ton, with some higher grade material exposed in seams and small shoots. The operators are trucking selected ore weekly to the Dayton mill near Virginia City, Nev. Ray Towers will supervise the new mill.

Rawhide Queen Operations

The Rawhide Queen Co., is milling 100 tons of ore daily, taken from the dumps of the Rawhide Queen and other old mines in the Rawhide district near Fallon, Nev. Gold is recovered by cyaniding. The company, controlled by Los Angeles capital, is reported to control some of the principal mines at Rawhide, with active development of promising ground planned in the near future.

A S & R Closes Utah Smelter

The American Smelting and Refining Co. planned terminating of smelting and sintering operations at the Murray, Utah smelter late in October. Miscellaneous cleanup operations, however, will continue through December of this year. General manager R. D. Bradford cited the insufficient ore supply as the principal reason. Some of the plant's 250 workers were to be transferred to the company's nearby Garfield plant where new and expanded facilities for manufacturing copper anodes for the new Kennecott refinery are progressing rapidly as well as to other plants operated by the company in the intermountain area. Other company lead smelters are located at Leadville, Colo., East Helena, Mont., Selby, Calif., and El Paso, Tex. Copper smelters will continue in operation at Garfield, Utah, El Paso, Tex., Tacoma, Wash., and Hayden, Ariz.

Leadville Drainage Tunnel

Continuation of work on the Leadville, Colo., mine drainage tunnel has been recommended by the Senate Appropriations Committee. The Interior Department money bill includes $250,000 cash and an additional $250,000 in contract authority for further construction of the bore. Neither amount was in the bill as passed by the House. The tunnel was begun as a war project to unwater shafts in the Leadville district. Work was stopped after the expenditure of $1,400,000; before the tunnel had reached a point where it could become effective. The Committee noted that the Bureau of Mines has estimated that another $500,000 will be sufficient to drive the tunnel through to the Hayden shaft, a distance of 2600 ft. About 3,000,000 tons of lead-zinc ores would be made available for mining through the unwatering of the district.

Plan Tonopah Custom Mill

Announcement was recently made that mining men of Tonopah, Nev., have formed a corporation to build a custom mill capable of treating 100 tons of ore daily. The site has been selected and building construction and equipment installation is expected to be started before winter. Full details are to be revealed later.

Ore possibilities in the region have been surveyed and sufficient ore to operate for many years will be available from nearby properties.

BOOK REVIEW

MINES REGISTER—1949. *By Dr. Joseph Zimmerman, editor-in-chief, Atlas Publishing Co., Inc., N. Y. $25.00. 730 pp.*

CLOSE to 5000 active nonferrous mining companies in the Western Hemisphere are presented in this latest edition of the *Mines Register*. Data is given on the location of the mines; the history of the company; the names and addresses of the officers and mining personnel; purchasing agents; the companies, capitalization, earnings and dividends for the past few years; ore reserves; description of the property and equipment; production for the past few years, and the number of men employed.

Also listed are more than 22,000 inactive mines and their location. Special sections of this valuable publication are devoted to statistical data concerning the metal industry; a list of company officials, mining engineers, mine managers, superintendents and purchasing agents and their company affiliations; and mining companies, securities and exchanges on which they are listed and price ranges for the years 1940-1948.

A comprehensive buyer's guide is included, listing the various types of mining machinery, equipment, and supplies together with the names and addresses of their manufacturers.



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Five Steps Boost Participation

1. See that a top management man sponsors the Plan.

2. Secure the help of the employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Payroll Savings Plan's benefits to them.

4. Make a person-to person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Nation-wide experience indicates that 50% of your employees can be persuaded to join—without high-pressure selling. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division. He is listed in your telephone directory. Wouldn't it be a good idea to call him right now, while it's on your mind?

The Treasury Department acknowledges with appreciation the publication of this message by

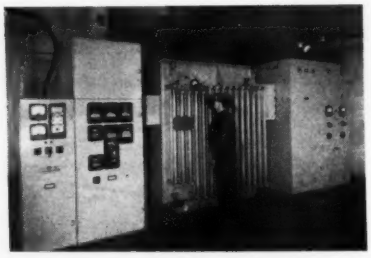
MINING CONGRESS JOURNAL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Manufacturers Forum

Ignitron Rectifier Reduces Costs

According to engineers of the Vinton Coal and Coke Co., Vintondale, Pa., the cost of power of 37½¢ per ton was reduced by means of a General Electric ignitron rectifier to about



23¢ per ton in two years. The unit installed in 1946 to replace obsolete steam electric generating equipment is rated at 300 kw and supplies dc current at 275 v for the tipple, mine lighting, and mine-locomotive operation within a distance of 1½ miles inside Mines No. 2 and No. 6.

New Sinker Drill

A new 45-lb class sinker has been announced by Gardner-Denver Co., Quincy, Ill. Known as the S48, this new sinker is said to have superior drilling, rotating and hole cleaning characteristics that make it especially suitable for use with tungsten carbide rock drill bits. The new drill is designed for either wet or dry drilling and may be converted easily without changing the backhead.



An improved steel puller on the S48 has no nuts to work loose and may be swung clear of the chuck when desired.

Bucket Tooth Point

A new tooth point for shovel and dragline buckets has been announced by the Baker Point Co., Chicago 45, Ill. A lasting quality of from two to seven times greater is claimed for the new point. It is available in two types; the solid point and weld-on tip with separate base. It is reported to work equally well in sand, clay, rock or shale with a 100 percent digging ability in oil shale. The point may be reversed from four to six times while still maintaining a sharp cutting edge.

Improved Shuttle Cars

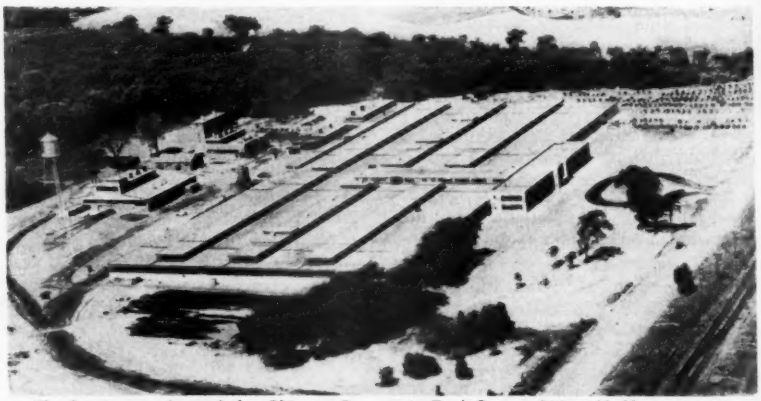
The Joy Manufacturing Co., Pittsburgh, Pa., has announced development of an improved, permissible, battery-type 5-SC shuttle car, which is said to combine the flexibility and safety of the battery-type car and the constant power of the cable-reel shuttle car. The new car features a built-in connector which permits tne operator to plug into a booster circuit at the unloading station. The power from the booster circuit unloads the shuttle car, while recharging the batteries at the same time. By this method, it is reported that the drain on batteries is reduced so much that hydraulic steering and hydraulically-adjustable elevating discharge are permitted. It is claimed that the batteries are able to produce the required power at the end of the shift as well as at the beginning.

Battery Cell-Filler

A new and improved Exide battery cell-filler has been announced by The Electric Storage Battery Co., Philadelphia, Pa. With the new cell-filler, maintenance men are reported to be able to add water to storage batteries with improved accuracy, speed and ease.



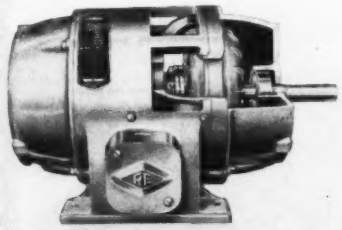
The new unit consists of a tube with a nozzle at one end and at the other end a handle equipped with a valve operated by finger control. An electric signal lamp flashes a warning when the water in the cell reaches the correct level.



The huge new plant of the Chicago Pneumatic Tool Co., at Utica, N. Y., is nearing completion. It comprises two six-acre sections divided for the production of rotary action and reciprocal action tools. Each division has its own air-conditioned, soundproofed physical, chemical and metallurgical laboratories and experimental shops

Fluid Drive Motors

Reuland Electric Co. of Alhambra, Calif., is producing new units called fluid-shaft motors in a single frame of integral design comprising the



motor and fluid-drive coupling. Smooth acceleration, protection from jamming and shocks, and elimination of starting difficulties are among the advantages claimed for the new fluid-shaft motors. Sizes now in production range from ½ to 10 hp.

High Lift Truck

A new type lift truck built by the Wagnermobile Co., Portland, Ore., is now at the oil shale project of the U. S. Bureau of Mines at Rifle, Colo. This machine features a telescopic lift which enables miners to reach a back 75 ft high. Although, while nested, it is only 20 ft in height. The



Two-man scaffold enables scaling of high backs

unit itself will extend to the height of 62 ft. It will be used to scale loose rock from the back of the oil shale mine when the third bench is cut and the back is 72-75 ft in height.

Built on a Wagnermobile tricycle chassis, the new piece of equipment is constructed for extreme maneuverability and roadability. It is powered by a 92-hp Hercules Diesel engine and is hydraulically operated with the exception of the cables which lift and lower the hoist.



One of the five W Internationals in service at the Patoka Mine of the Ayrshire Collieries Corp., Winslow, Ind. Powered with 200 hp Model NHB-600 Cummins Diesels, the units are equipped with 32-ton capacity trailers, but carry loads up to 37 tons over a four-mile round trip haul

Glass Hat

After more than a year of development and testing, the E. D. Bullard Co., San Francisco 3, Calif., has announced a new crown made of impregnated fiberglas. The non-shattering crown is said to be impervious to moisture and acids and able to pass all dielectric tests. Radiation tests are reported to show that the Bullard white hard boiled hat is comparatively cooler—inside to outside skin temperature—in comparison tests made with other safety hats. The new hat may be produced in practically any color desired, however, standard colors are white and grey.

— *Announcements* —

J. F. Fitzsimmons has been named manager of **Allis-Chalmers** commercial research department succeeding J. R. Reed.

John G. Caley has been appointed district manager of the **Mack Truck Co.**'s Birmingham, Ala., direct factory branch.

Fred Schmidt, formerly president of Electric Power Equipment Corp., has recently joined the **I-T-E Circuit Breaker Co.** as assistant to the president, W. M. Scott, Jr.

Templeton, Kenly & Co., maker of Simplex Jacks, has announced the appointment of **Mark C. Simpson** as manager of the Pennsylvania division sales. Mr. Simpson was formerly associated with Hockensmith Wheel Mine Car Co., the Brown Fayro Co., and other mining equipment producers.

The mining division of the **Cardox Corp.** has announced the appointment of **Layne-Minnesota Co.,** Minneapolis, as distributors for Cardox-Hardsocg drilling equipment in the southern halves of Minnesota, Wisconsin, South Dakota, North Dakota, and Montana.

CATALOGS AND BULLETINS

DIESEL ENGINE APPLICATION. *Caterpillar Tractor Co., Peoria 8, Ill.* "Mining for a Profit" is the title of a new bulletin describing the application of Caterpillar Diesels in various types of mining operations. First-hand data and on-the-spot photographs highlight data on Diesel power use.

FLAME SAFETY LAMP. *Mine Safety Appliances Co., Pittsburgh 8, Pa.* This new bulletin describes a small size lightweight Wolf junior flame safety lamp made of aluminum. A longer burning time than usually found in standard lamp models is claimed for the new model. Seventy percent of the junior lamp parts are interchangeable with those of standard model lamps. Further information may be obtained upon application to the manufacturer.

FLOTATION. *Denver Equipment Co., Denver, Colo.* The theory, application, and results of flotation are treated in a recently published bulletin. In a most attractive manner, the entire history of flotation is presented. A series of photographs show flotation equipment in operation treating a variety of metal and nonmetallic products. In addition to discussing the theory of flotation and its application, various flow sheets are outlined to aid mill operators in deciding which arrangement best suits their particular needs. Detailed data is included that enables mill operators to select the proper size of flotation machine to handle a particular tonnage.

Copies of this bulletin may be obtained from the Denver Equipment Co., 1407 17th Street, Denver 17, Colo.

HYDRAULIC DRILL JUMBO. *Joy Manufacturing Co., Pittsburgh 22, Pa.* A recently released 12-page bulletin covers Joy hydro-drill jibs for low cost, mechanized drilling. Applications of track-mounted jib-jumbos and rubber-tired, self-propelled Drillmobiles are featured along with examples of cost-cutting uses of the hydro-drill jib.

WOVEN WIRE SCREEN. *Robins Conveyors Division, Hewitt-Robins Incorporated, Passaic, N. J.* Descriptions and tables covering a wide variety of wire screen and means of determining recommended types for specific applications are covered.

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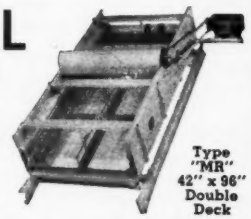
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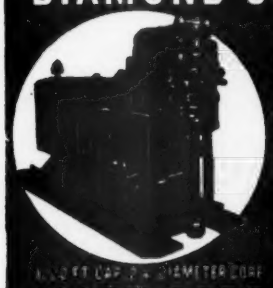
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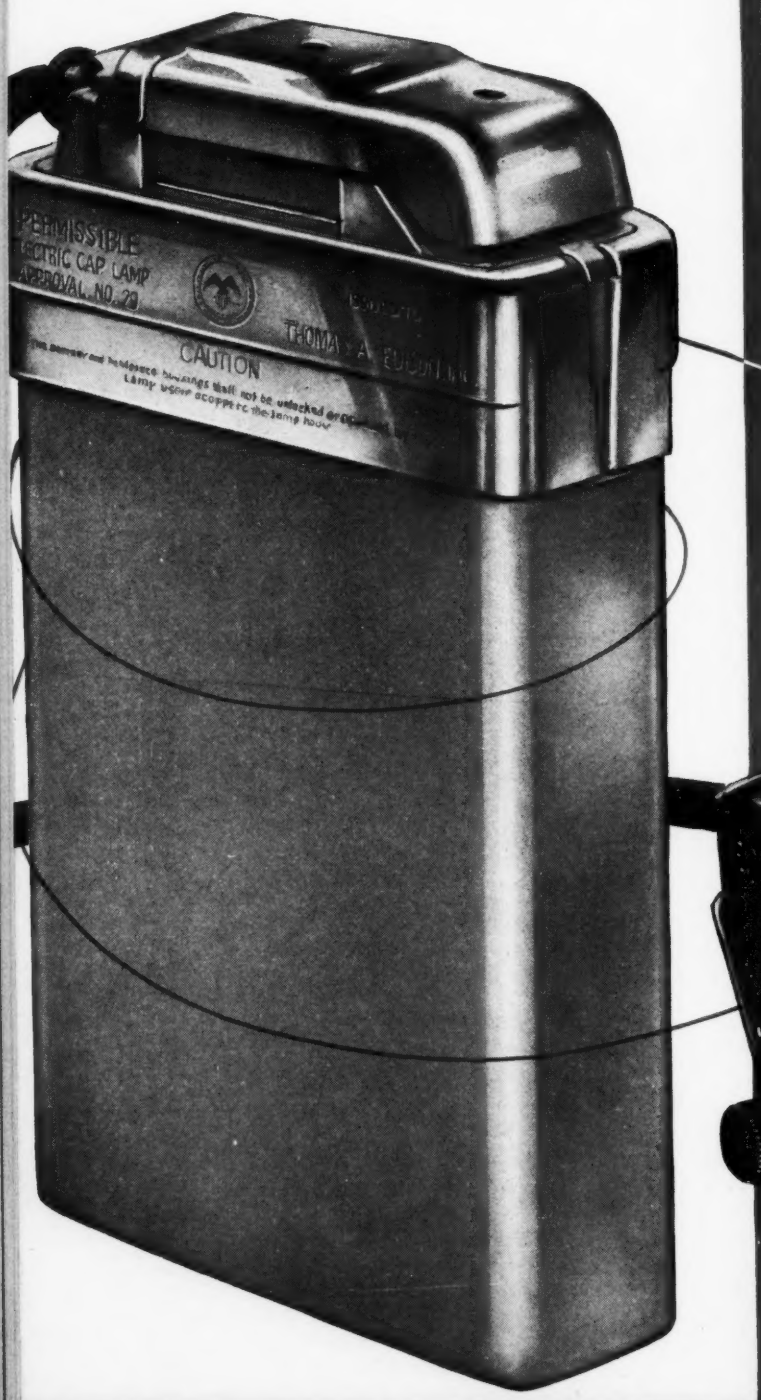
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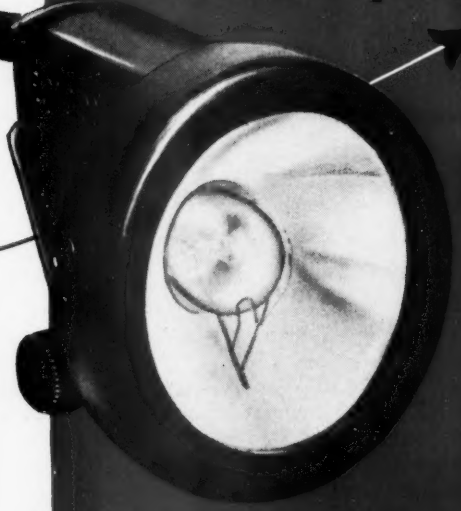
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